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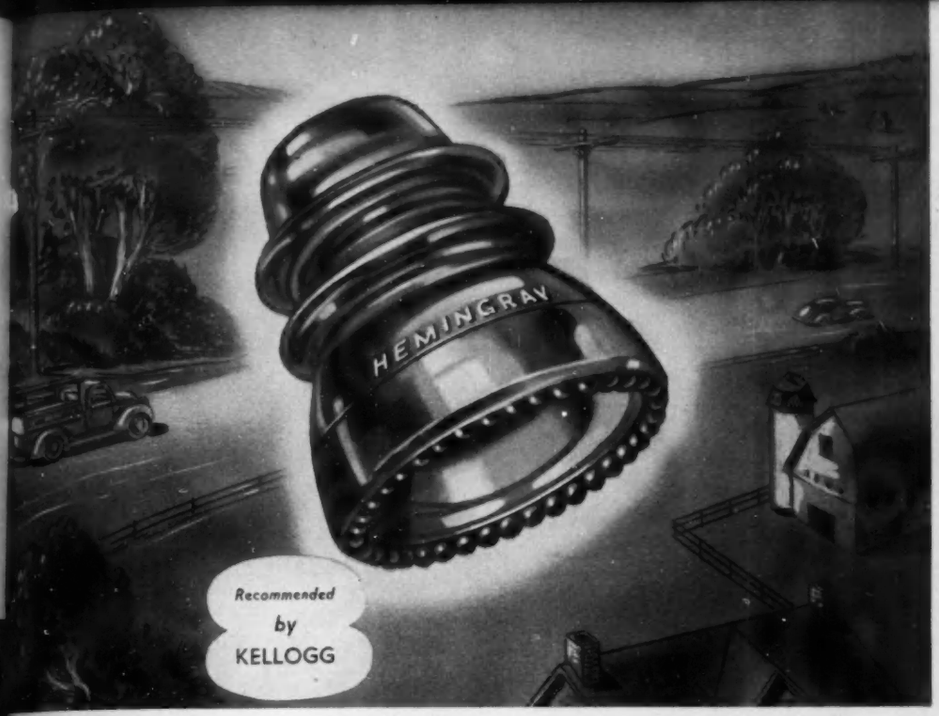
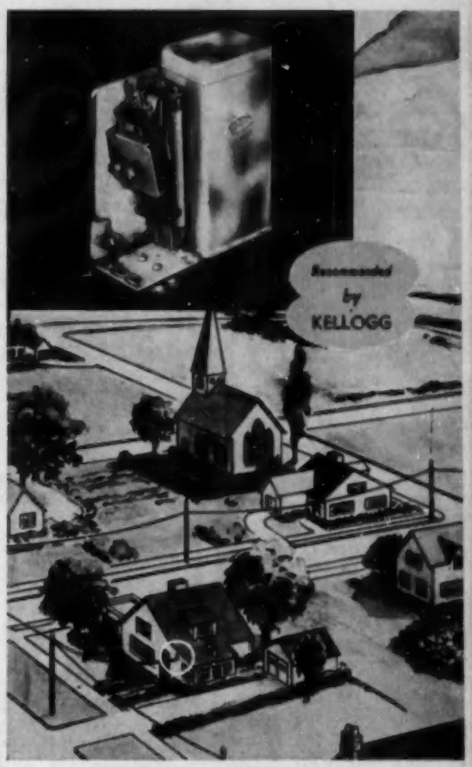
JULY 1943

LET'S LOOK

AT THE 1911 RECORD



Owens-Illinois Glass Co. Summer heat waves, winter cold snaps, spring thaws may do their worst—but Hemingray insulators, barring accidents, regularly outlast poles! Controlled production assures high structural and sustained dielectric strength.



Cook Electric Co. Look into this new Cook development—the Cook Type B Sub-Station Protector. Available for two applications: for outside mounting on post, wall, etc. with bracket and hood; and for inside without hood.

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We are quite proud of the recent awards made to our organization and now gracing our editorial office walls. The first one was an "Award of Merit" issued to our publication by the Navy Department and signed by Rear Admiral Ben Morrell for our assistance to the "Seabees." The latest one, reproduced in the July issue of Fortnightly, was from the United States Treasury Department for Distinguished Services in behalf of the War Savings Program and signed by Secretary of the Treasury Henry Morgenthau, Jr.

▼

The WPB Communications Division is not going to stage any Industry Advisory Committee meetings until September unless emergencies require such special sessions. The Division staff and the "task" groups of these committees, however, are expected to continue studies of problems in the wire communications field, especially the situation of the telephone instruments supply.

▼

The outstanding job being done by the Signal Corps in the war zones lends additional weight to the Editorial on page 24 by Frank McKinney. We hope you read it! Employees and employers alike will find plenty to think about after reading Frank's experiences.

Ray

TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

& MANAGEMENT

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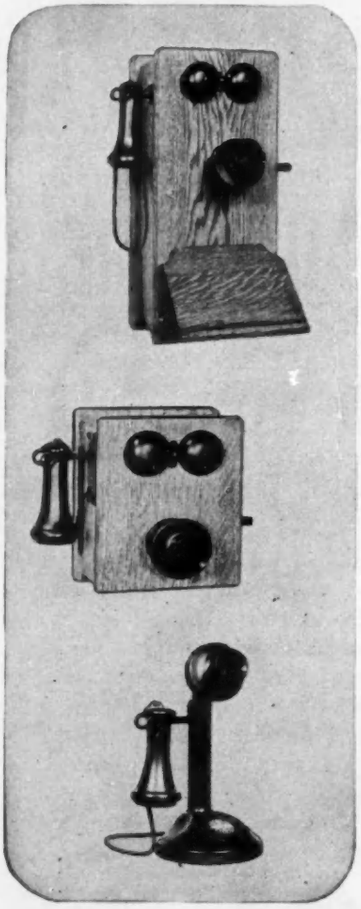

Salvaging all possible material is an important factor in winning our battles at home — battles against shortages, wear, time, and lack of manpower.

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LETTERS

from TELEPHONE ENGINEER readers

Anchorage, Alaska

Good morning, Mr. Smith!

Receiving TELEPHONE ENGINEER and its companion Fortnightly from time to time being forwarded to me at the various "outposts" up on the top side of this now small world by my good wife is like receiving another letter from home, with pictures of so many people I have seen and know and met during the many years I was a sales representative with the Monarch Telephone Manufacturing Company and its successor the Automatic Electric Company.

Comments about them and from them, their varied activities, and now more than ever the need to save materials and the wonderful spirit of cooperation being shown by so many as expressed in the pages of the ENGINEER pointing out individual ways and methods of doing things to help each other to get along during these times of scarce and almost nonexistant materials makes very interesting reading along with the general news relating to our industry.

I have just received several bundles of Fortnightly and TELEPHONE ENGINEERs and while some are now dated 1942 they are just as welcome.

In looking thru the October, 1942 issue, page 64 is noted four steps how to rebuild a switchboard cord, using a thread wrap as a binder on the outer braid.

I too did this long ago but found what I believe is still much simpler and an easier way to do this job and here is another tiny saving of material, WITHOUT THE USE OF ANY THREAD making the job almost identical to a new cord.

Here is my way:

1. Cut back the cord to firm material.
2. Slide back the outer braid then cut away the under braid far enough back to allow the conductors to be long enough to properly reach their plug connections.
3. Slide forward the outer braid to its full length cutting off again that necessary to leave about a half-inch overlap beyond the layers underneath and here comes the difference. Now use a very small screwdriver or equal and TUCK the outer braid end under itself which replaces the layer cut off inside. This gives a butt that is not enlarged or hard to force back into the plug. There are no frayed ends. The plug grips the braid so the cord will not pull out. It is neat, easy to do and no materials required. I have used this method for years with perfect satisfaction. It really is as neat as a new cord requiring no special thread.

Alaska is, I believe, a very different

(Please turn to page 59)

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by

ROLAND C. DAVIES
Editor, Telecommunications Reports

THE confusion of the domestic front which has dominated the National Capital during recent weeks found the FCC and its Chairman James Lawrence Fly out in the forefront of the feuding Federal Agencies along with the ousting of Chester Davis as War Food Administrator and the bitter controversy between the RFC and BEW through their respective chieftains, Jones and Vice President Wallace.

The FCC came under fire when the special House Committee, headed by Rep. Cox (DGA), started its investigatory hearings during early July with its assault on the Commission centered against the latter's so-called "war" activities, particularly its radio monitoring and foreign broadcasting "listening" functions. Coupled with the launching of the Cox investigation proceedings, was the surprise and "mystery" withdrawal by President Roosevelt of the renomination for another seven-year term of Commissioner George Henry Payne the day after he had dispatched his selection to the Senate.

WHO will be selected by the President to take the post on the FCC, held by Commissioner Payne, who styled himself as a progressive Republican was not known as this issue went to press. One leading possibility, who was understood to have very strong Republican backing in the Senate, was that of former FCC Assistant Chief Engineer E. M. Webster, who was recalled to active duty with the Coast Guard as a Captain to take charge of its extensive wire and radio communications systems, a post which he had held for a number of years prior to his retirement from the service when he joined the FCC. Another name in the forefront of possibilities was that of FCC Chief Engineer E. K. Jett, who likewise is rated in the topflight of government communications engineers and who has achieved a notable reputation in Congressional and governmental circles for his technical ability in that field. Congress has supplied another possibility in the name of Rep. Karl Stefan, Nebraska Republican and member of the House since 1935 who was former commentator on a broadcasting regional network in that state.

"Clerical Error"

WHILE the explanation for the withdrawal of Commissioner Payne's nomination in less than 24-hours after its submission to the Senate was reported to be that his name went up through "a clerical" error, the action was believed to have been based more upon the fact that any incumbent member of the FCC during the Cox Committee probe would have a most difficult time of Senate confirmation. In the case of the other possibilities, mentioned above, there would be practically no obstacles in the path of their confirmation, it was felt. This was deemed to be true, especially, in the case of Captain Webster and FCC Chief Engineer Jett because they have not been involved in the political aspects of the Commission and are qualified because of their long backgrounds in communications and radio engineering.

Chairman Fly Charged

THE barrage of the attack of the Cox Committee was leveled principally against Chairman Fly and featured more than 50 charges that the FCC Chieftain had obstructed the prosecution of the war effort in many ways and had blocked the Army and Navy in a number of instances in their war activities. The high point of this blocking of the military services was revealed by Cox Committee Counsel Eugene L. Garey when he disclosed that last February 1 Admiral William D. Leahy, the Chief of Staff to President Roosevelt had written Secretary of the Navy Knox on behalf of the Joint Chiefs of Staff urging that the FCC Radio Intelligence Service be transferred to the Army and then a week later Secretary of War Stimson and Secretary of the Navy Knox wrote the President endorsing this recommendation and transmitting a draft of a proposed executive order to transfer the RID service from the FCC to the Army. These two letters stressed that from the standpoint of coordination and security, together with the prevention of duplication of effort, personnel and equipment, this service rightfully belongs under the sole control of the military forces.

Other charges of obstructing the war effort which were voiced by Committee Counsel Garey were that Chairman Fly had endeavoured to dominate the Board of War Communications; had opposed the broadcasting activities of the Army Signal Corps to improve morale of troops stationed in Alaska and other outposts; had opposed the position of the armed services with regard to the International Telegraph merger; had prevented the finger printing investigations of ship radio operations and FBI and Naval Intelligence; and had dominated the Interdepartment Radio Advisory Com-

Officers and directors re-elected by the California Association at its recent meeting: Standing (l. to r.) H. F. Knapp, director; J. E. Newman, vice president; O. E. Emley, director; F. V. Rhodes, secretary. Seated, (l. to r.) Wm. DeCarteret, vice president; James S. Campbell, treasurer, and C. F. Mason, president.

mittee in its allocation of frequencies to the military services, together with disputing with the Army and Navy in connection with purchases of radio apparatus. Serious accusations were directly voiced against Mr. Fly which charged him with having opposed wire-tapping legislation and the stoppage of Japanese foreign language broadcasts from Hawaii before Pearl Harbor which indirectly seemed to picture him in the light as having contributed to that catastrophe.

Accuses Commission of Trying to Dominate

COX Committee Counsel Garey in outlining the evidence uncovered by his staff stated that it is clear the practically unrestricted delegation of power to the Commission, made by the phrase "public interest, convenience or necessity" contained in the Communications Act created ample and unlimited opportunity for the FCC to distribute Government favor and largess among the politically faithful; "and ample power with which to whip and cow all political opponents" who might challenge the actions or policies of the Commission; and inferred that the FCC "has not altogether failed to take full advantage of the opportunities presented to establish its own purposes and policies and advance its own ends . . . to the point where on occaasion it has even defied the Congress." "The phrase 'public interest, convenience or necessity' needs only the proverbial 'man on horseback' to bring about a situation such as is said presently to obtain," he added.

Referring to Section 307 (a) of the Communications Act which authorizes the FCC to distribute licenses and frequencies, Mr. Garey said that evidence gathered by the staff of the Cox Committee will be presented clearly indicating that at least in this statutory direction, the Commission has wholly failed to observe the express intent of the Congress as laid down in the 1943 Act. He declared that a determination should be made as to the extent to which relief by appropriate legislative action can be accorded against proven and conceded abuses.

Judge Garey then summarized 24 specific accusations leveled against the FCC and brought to the attention of the Committeee for its investigation. These changes ranged all the way from accusation that "it (the FCC) has been and is so completely dominated by its Chairman (James Lawrence Fly) that, for most purposes, it has become and is a one-man Commission," to a charge that "it has set up a group commonly called 'the Gestapo' for the purpose of unlawfully dominating the radio industry and rendering it subservient to its will" (This referred to the unit of FCC investigators who have been probing broadcasting stations, mainly those owned by newspapers.)

Other charges against the FCC are that it is entirely motivated by political partiality and favoritism; that it has terrorized the radio industry; that it acts arbitrarily, capriciously and without warrant of law; that it has sought to **dominate and control the entire communications field, both private and Governmental;** that it has usurped the functions of Congress by arrogating to itself the determination of matters of legislative policy and that it has misrepresented itself before Congress for the purpose of obtaining appropriations.

Committee Counsel Garey also accused the FCC of having violated the law of the United States and defying the will of Congress. He alleged it has sought to cloak itself as an essential war agency, whereas in truth its alleged war activities are a danger and menace to national security; that to further its war activities it has drawn on manpower and critical materials needed by the armed services; **that in its pursuit of power and dominance over broadcasting it has neglected its functions and duties in other fields of communications;** and that, notwithstanding the express statutory prohibition to the contrary, it has sought to censor radio broadcasts and interfere with the right of free speech over the radio.

Accusations

IMMEDIATELY after the disclosures at the Cox Committee hearing, Chairman Fly cracked back with the accusation that all the charges constituted "a tissue of falsehoods" and alleged that Cox Committee Chief Counsel Garey, whom he termed "a Wall Street lawyer," had violated war secrecy in revealing the letters of Admiral Leahy from the joint Chiefs of Staff and of the Secretaries of War and Navy to the President on the proposal to transfer the FCC Radio Intelligence Division to the Army. Mr. Fly was evidently attempting to use these

New Chief Signal Officer

Maj. Gen. Harry C. Ingles, Chief Signal Officer.
U. S. Signal Corps Photo

Major General Harry Clyde Ingles was confirmed by the Senate June 29 as Chief Signal Officer of the Army.

He succeeds Major General Dawson Olmstead who retired from that post at his own request and July 1 is to be assigned to represent the War Department on an important postwar policy planning board. General Olmstead returned to the War Department June 30 to have a farewell meeting with the principal officers of the staff of the Office of Chief Signal Officer.

General Ingles brings to the post a most distinguished and lengthy record of Signal Corps and General Staff assignments and, highly important, experience in the European theatre of operations where he was Deputy Commander under the late Lieutenant General Frank M. Andrews.

It is believed that the new Chief Signal Officer may make some changes and revamping in the Office of the Chief Signal Officer in Washington and possibly some important shifts in the field.

Convention Dates

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 16 and 17.

United States Independent Telephone Association, Hotel Sherman, Chicago, October 14 and 15.

Virginia Independent Telephone Association, Roanoke Hotel, Roanoke, November 4 and 5.

disclosures to find an "Achilles' heel" of the House probe committee. The FCC Chairman let loose a vitriolic blast against the House body with the charge that it, together with the "military" and the "radio monopoly," were trying to "wreck the Commission." Rep. Cox declared that Mr. Fly had been thrown "into a state of hsyterical wrath" and accused him of trying to undermine the confidence of the American public and the members of the armed forces in the commanders of the Army and Navy. Rep. Cox pointed out that the FCC is made up of several hundred employees "that many of our citizens could better serve our country during this great conflict by carrying guns." In a later press statement Chairman Fly retaliated with the declaration that the FCC if and when it is given an opportunity to present its side, will disprove all the charges.

Hearings on Telegraph Merger

THE Western Union-Postal Telegraph plan for a merger of the domestic telegraph systems was started on its course to secure governmental approval with hearings before the FCC July 7. Four state commissioners sat with the Federal Commissioners at the proceeding with the objective of securing through this joint Federal-State regulatory inquiry a speedy sanction of the merger program so that the two telegraph companies can be consolidated by October 1 when their merger purchase agreement expires.

Stockholders of Western Union and Postal Telegraph are to hold special meetings in New York City on August 10 for the purpose of sanctioning the merger plan.

For the telephone industry the proposals of the transfer and sale of the teletypewriter exchange service and private line teletypewriter and Morse services are not to be consummated by the American Telephone and Telegraph Co. until the merger of Western Union and Postal Telegraph is assured. The negotiations for the transfer of these telegraphic services will take place with the merged company, it has been authoritatively stated. The Bell System has assured the employees affected that they will be protected either in the merged telegraphed company or in remaining with the A.T. & T. Long Lines Department.

Awarded Silver Vail Medal

Vice Pres. & Gen. Mgr. Paul L. Thoren and Ross Byron, Pres., Rossville Tel. Co. admire silver Vail medal of Mrs. Crouse. Mrs. Mary Strickler of Rossville Tel Co. at right.

Mrs. Jennie Crouse of the Rossville (Ill.) Telephone Company was awarded the Silver Vail Medal and $500 last fortnight in the offices of A. H. Mellinger, president of the Illinois Bell Telephone Company. Mrs. Crouse had already been awarded a bronze Vail Medal and $100 before this presentation by Mr. Mellinger.

Mrs. Crouse, an operator, was the heroine and central figure in the tornado which cost six lives and left the little town of Alvin, Ill. a mass of wrecked homes and buildings on March 16, 1942. Alone when the two-coned tornado struck, she shielded her face from flying glass and other debris and ran outdoors to determine the extent of damage to the town. Then she began a series of acts which demonstrated the prompt and effective use of telephone facilities in summoning and organizing aid and alleviating distress during a disaster.

First she telephoned the chief operator at Rossville on the only remaining outside circuit and called for doctors, ambulances and all possible volunteer help. With only five subscribers' telephones in service, the Alvin townsfolk, some painfully injured, crowded into the telephone office to call for help. Mrs. Crouse made the connections, and in some cases did the talking for those who were too seriously hurt or too panicky to talk for themselves.

The telephone office not only became information headquarters, but also was turned into a first aid station. Through it all Mrs. Crouse also was dispatching doctors and ambulance drivers to homes of injured persons. The tornado had struck before noon, and Mrs. Crouse, with the help of her sister, remained at the switchboard until 2 a. m.

Award of medal, certificate and $500 check to Mrs. Crouse by Illinois Bell President, A. H. Mellinger.

Promoted to Major General

PROMOTED to the rank of Major General after he had been Brigadier General for approximately a year, William H. Harrison, A. T. & T. vice president and chief engineer on military leave, was transferred July 1 to the Office of Chief Signal Officer to take charge of directing important Signal Corps procurement activities. Major General Harrison has been serving as a principal aide to Lt. Gen. B. B. Somervell, Commanding General of the Army Service Forces, both as Director of Army Procurement and recently as Chief of the Army Pictorial Service.

Ever since he came to Washington in July 1940, with the former National Defense Advisory Commission in charge of Army and Navy construction activities, General Harrison has been in the forefront of the war effort picture. When the N. D. A. C. was dissolved, he went with the Office of Production Management and was named Director of Production for O. P. M. in Aug. 1941, and remained in that capacity with the War Production Board until June 17, 1942, when he was

(Please turn to page 36)

EDITORIAL

We are reproducing in full the Editorial carried in the June "Ohio Telephone News." Its Editor, Frank L. McKinney, is the author. We believe those that know him will have the same mental picture we did while reading his experience on a very timely subject.

TWO nice looking motherly women were standing outside the street entrance to the building that houses our Association offices.

"We lost our maid the other day," said the oldest and plumpest of the two, to her companion. "After fifteen years," continued the speaker, "she decided overnight that she wanted to earn a lot more money, and left us to take a job as a waitress. The odd part of it is, that she probably won't be nearly as well off in the end. Doesn't it beat all?"

"She'll be back," predicted the second Matron.

"Oh, No She won't," snapped the first woman. "When the war's over I'll have a maid again, but I'm going to employ a much younger woman than Mae. As long as Mae remained with us she had an AA1 priority on her job, but now that's all washed out. By leaving us in the lurch, she released us from all of the obligations that one owes to an old servant. My husband even had to change his will—we had planned to leave her a thousand dollars."

The two women moved forward and merged with the crowd.

Your Association Secretary smiled at this commonplace conversation, which for some reason kept drifting back into his mind during the afternoon.

It was almost closing time when a veteran Ohio telephone worker entered the office. He grinned a little bashfully, and had to be twice invited to sit down, before he found himself fully at ease.

"I've been thinking about the big dough that some of these Columbus plants are paying for my kind of work," he said at last, "and I wonder if you'd tell me who to see out at the..... works. I don't like to go out there cold without having the name of somebody in charge."

Your Secretary puffed at his pipe and thought about the two women he had heard talking together earlier in the day.

"So you want some of the easy money. The telephone business isn't good enough for you—Huh?" he complained bitterly.

"Well, Naw. It ain't that," apologized his Visitor, "but you know how it is. Everything costs more, and it does seem like I ought to make all I can while the war's on."

"You know that you're already working in an essential industry?"

"Yeah—but the pay—,"

"And that the big money jobs aren't going to last forever. They're temporary, like crap shooting profits, that's why they have to pay more. What are you going to do when peace returns, and the .....works closes down?"

By this time the Visitor didn't seem to be altogether happy, but he replied, "Why I'm a good telephone man, and I'll be ready to work on any of the jobs that the companies can't do right now, for lack of men and materials. I thought I'd come and see you and ask what the operating companies had to offer."

THE Secretary shook his head.

"When the war ends, old man," he said, "I'm going to be awfully busy. We've sent a lot of bright kids into the Signal Corps and other armed services, who have been learning all the new tricks in telephone construction and operation, and have been doing a considerable amount of valuable work with machine guns and artillery on the side.

"Those lads are going to have first call on all of the jobs that I can locate for a long time after the shooting stops. The ancients of the telephone business, who step out now to join the big money stiffs may find that they're leaving the old homestead for good.

"If you were a telephone plant superintendent of the year 1944, whom would you hire first—a veteran telephone man carrying a pink slip from a defense plant that has discontinued operations, or a recent Master Sergeant who comes to you direct from the Signal Corps, wearing a half dozen medals. Tell the truth! Which Guy would you hire?"

The Visitor replied indirectly and with emphasis "I think it would be smart for me to go back home and go to work," he said.

Telephone Engineer's TRAINING COURSE

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ELECTRICAL FUNDAMENTALS FOR THE TELEPHONE MAN

☆

Conductors and Insulators Electrical Units---Part III

Definition

ELECTRICITY is so common in our everyday lives that it hardly seems necessary to point out that it will flow through most metallic substances and certain liquids, but not through other non-metallic substances such as wood, paper, cloth, etc.

By definition, **any substance which will permit the ready passage of electricity is known as a conductor. Also, any substance which does not permit electricity to pass through it readily is known as an insulator.** Insulators are also referred to as non-conductors.

Various Conductors

THE following list of conductors are listed in the order of their respective merits as conductors and with silver rated as 100% as a standard of comparison.

1. Silver	100%	4. Iron	16%
2. Copper	98%	5. Lead	15%
3. Aluminum	61%	6. Mercury	1%

Various Insulators

The following materials which are in general use as insulators are listed in order of their respective merits as insulating mediums. It will be noted that mica heads the list as one of the best insulators.

1. Mica	4. Rubber	7. Air
2. Glass	5. Silk	8. Paper
3. Porcelain	6. Shellac	9. Wood

Many of the insulating mediums used in practical work are compounds which can be easily molded or turned to any desired shape. One of the best known of these synthetic materials is **Bakelite.** Bakelite is the invention of Dr. L. H. Baekeland who discovered that carbolic acid and formaldehyde could be made to unite chemically so as to produce a hard, dense substance that could be beautifully colored and which could be molded to any desired shape. After the chemicals which are combined to produce Bakelite have been united, the resulting semi-plastic material is placed in steel molds and subjected to temperatures of around 360 degrees (F) and to a pressure of from 1,500 to 2,000 pounds per square inch.

After being in the mold for 5 or 10 minutes, a chemical reaction sets in and the plastic material turns into a hard, smooth material having excellent insulating properties. After this change sets in, the new material is insoluble and no amount of heat will cause it to change to its original form.

Other types of synthetic insulating materials are Formica and Micarta.

Effect of Moisture on Insulation

SOME substances are good insulators when dry but become conducting when wet, wood and paper being particularly bad in this respect. The insulating qualities of wood and paper are greatly improved by impregnating with paraffin or beeswax.

Fig. 36. — Glass and porcelain insulators.

Mica, glass, and porcelain are extensively used as insulators in the electrical industry. (See Fig. 36). Familiar examples are glass and porcelain line wire insulators for telephone and

power circuits. Mica is used in electrical apparatus requiring high dielectric strength and insulating qualities.

Electrical Hazards

PURE water is a good insulator but the slightest trace of impurities will turn it into a fair conductor. A drop or so of acid added to a bucket of water will make it very conductive. Cement when damp is as excellent a conductor as is the earth. A person should **never handle commercial light or power circuits when standing on the ground,** particularly when the ground is damp. The same caution also applies to handling wires **when standing on cement.** Under certain conditions sufficient current may pass through the body and into the ground as to cause death or serious injury.

Power Distribution Systems

POWER distribution systems such as are found in every city are so arranged that the **secondary** or **low voltage** wires are generally grounded on one side. This protects anyone who might come in contact with these low wires from getting a high voltage shock in the event that a cross should exist between the high voltage and low voltage wires. Figure 37 illustrates how a person might receive a high voltage shock in the event of a cross in the transformer on a system which is not properly grounded.

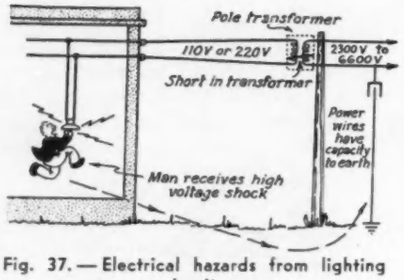


Fig. 37. — Electrical hazards from lighting circuit.

Conductors and Resistors

CONDUCTORS used in electrical work may be considered as falling into two general classes, namely, those whose purpose is to conduct electricity from one point to another with the minimum loss of power (for example, copper and aluminum) and those placed in the circuit to retard the current, (for example, German silver wire, Nichrome wire, carbon, etc.). This latter type of conductors are referred to generally as **resistors,** because they resist the flow of current.

A good example of the use of a resistor is the Nichrome wire used in the typical electric flatiron. This wire, having a high resistance, impedes the flow of current through it but in so doing heats up and the heat is utilized to operate the iron.

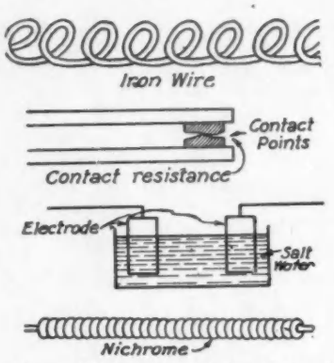


Fig. 38. — Various forms of electrical resistance.

Manganin is a resistor material from which resistances found in electrical testing instruments are made. Its advantages are that its resistance does not change with changes in temperature. Manganin is an alloy of copper and manganese.

Figure 38 illustrates various types of resistors or points at which resistance may appear in a circuit.

Whenever it is desired to cut down the amount of current flowing in a circuit, a resistor can be used. Radios have dozens of resistors in them which are used to control the currents flowing through the various transformers and vacuum tubes.

Figure 39 illustrates various types of fixed resistors commonly used in radio and telephone circuits.

Conductors Used in Electrical Work

HOUSES are generally wired with what is referred to as **rubber covered wire.** This is a rubber insulated copper conductor with an outer waxed braid. The size of conductor ranges from No. 8 to No. 14 B & S gauge wire. Branch circuits which are lightly loaded can be wired with No. 14 wire. The main circuit must be No. 12 or larger wire. Power wiring for feeding large motors, electric stoves, etc., require wires ranging in size from No. 10 to No. 0000. Apparatus such as floor lamps, irons, etc., is connected to electrical power circuits by flexible rubber and cotton braid covered and stranded No. 18 or No. 16 B & S gauge conductors.

The wires which extend from power transformers and poles of the distributing system to buildings are known as **weatherproof** wire and the insulation is a tough tar impregnated fibre having an outer cotton braided covering. It does not offer as good insulating qualities as rubber covered wire, however, has a much longer life, hence is more suitable for outdoor use.

Line Conductors

THE transmission line conductors which carry power from one point to another, such as between cities or for rural distribution, consist of aluminum wire. In some instances, wire consisting of a central conductor of steel surrounded by strands of copper or aluminum wire is used. The steel gives great strength and the aluminum or copper adequate conductivity. In a few instances, solid iron wire such as No. 4 or No. 6 is used for the transmission of electrical power where the amount of power to be transmitted is relatively light. Iron wire, however, is not generally considered suitable for transmission lines as the resistance results in a large power loss in the wire.

Telephone rural lines utilize a No. 12 iron wire, and toll circuits generally employ a No. 12 copper wire.

Telephone lines for city subscribers are carried in lead-covered cables containing paired copper wires insulated with paper. The wire size is generally 24 G and the largest size cable is about three inches in diameter carrying up to 3600 wires.

The wiring in radio sets and delicate electrical equipment is generally No. 20 or 22 gauge wire either stranded or solid.

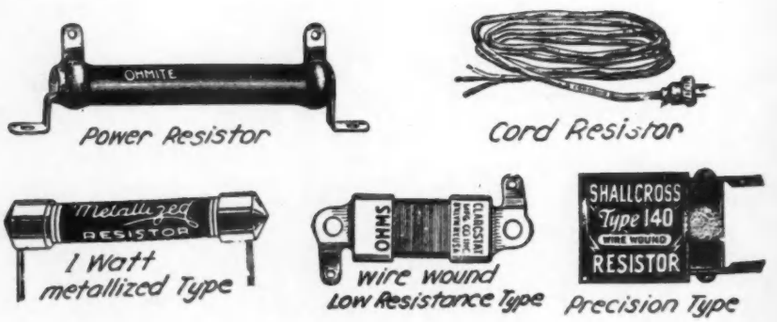


Fig. 39. — Fixed resistors used in radio and telephone circuits.

Copper Wire Table

THE following table gives the principal mechanical characteristics of copper wire.

Note — The cross section in circular mils for each gauge of wire shown is not given in the table but may be readily computed by merely squaring the diameter (in mils) which is given.

B & S Ga	Diam. in Mils	Ohms per M Ft.	Lbs. per M Ft.
0000	460	0.050	641
000	410	0.063	508
00	365	0.0795	403
0	352	0.100	319
1	289	0.126	253
2	258	0.159	201
3	229	0.201	159
4	204	0.253	126
5	182	0.319	100
6	162	0.403	79.5
7	144	0.508	63.0
8	128	0.641	50.0
9	114	0.808	39.6
10	102	1.02	31.4
11	91	1.28	24.9
12	81	1.62	19.8
13	72	2.04	15.7
14	64	2.58	12.4
15	57	3.25	9.86
16	51	4.09	7.82
17	45	5.16	6.20
18	40	6.51	4.92
19	36	8.21	3.90
20	32	10.4	3.09
21	28.5	13.1	2.45
22	25.3	16.5	1.94
23	22.6	20.8	1.54
24	20.1	26.2	1.22
25	17.9	33.0	0.97
26	15.9	41.6	0.769
27	14.2	52.5	0.610
28	12.6	66.2	0.484
29	11.3	83.4	0.384
30	10.0	105.0	0.304
31	8.9	133.0	0.241
32	8.0	157.0	0.191
33	7.1	211.0	0.152
34	6.3	266.0	0.120
35	5.6	335.0	0.0954
36	5.0	423.0	0.0757
37	4.5	533.0	0.0600
38	4.0	673.0	0.0476

Copper wire ranges in size from No. 40 which has a diameter of only .003145 inches to No. 0000 which has a diameter of 0.460 inch. Wire sizes larger than No. 0000 are rated in terms of **circular mils.** Street car feeder conductors and other wires which carry large currents often have areas as much as one million circular mils!

Resistance Devices

IN the utilization of electricity resistors play a prominent part. This is particulary true in radio circuits. In electrical or power circuits the use of resistors is for heating elements, as, for example, the alloy wire used in electrical stoves, flat irons, toasters, etc. There is generally little occasion for inserting a resistance in an electrical circuit in the average home or business in order to reduce the amount of current flowing in a circuit, as to do so is wasteful of power.

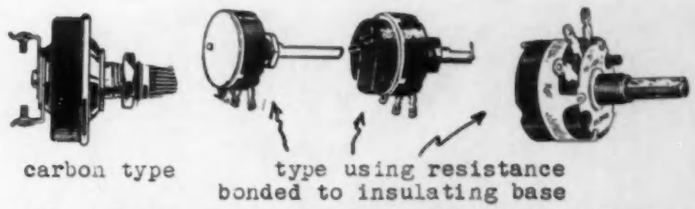


Fig. 42. — Variable resistors used in Radio, Telephone and Electronic Circuits.

In radio circuits, however, the current and power involved are generally quite small, hence the power loss is of no consequence and we are more concerned with making the delicate radio currents accomplish certain things. Resistors used in radio and communication circuits consist of two basic types, namely, **fixed resistances** and **variable resistances.** The fixed resistance has some definite value or rating in ohms and is not adjustable. Variable resistors also have some maximum resistance rating but can be varied over a certain range. Figue 42 illustrates the several types of resistors used in radio circuits. Variable resistors are generally of two types, viz., those having two terminals which permit merely a simple variation in resistance, and those having three terminals, known as **potentiometers,** which permit varying the resistance of a center arm between two limits. In using resistors it must be kept in mind that even though a resistor has a definite ohmic resistance, it does not necessarily mean that the resistor is suitable for any circuit requiring a resistor of this value, as the power handing capacity **the resistor must also be taken into account.** Resistors are rated by the number of watts which they can handle without damage. For example a 1000 ohm 50 watt resistor could handle a maximum current of 244 milliamperes safely. That is $P = I^2R = .224^2 \times 1000 = 50$ watts.

The Volt, Ampere, and Ohm

IN working with electricity we must become familiar with the various units which define the principal characteristics and effects of electricity.

(Please turn to page 44)

Extension Granted by FCC On Continuing Property Record

A six months entension from July 1 to January 1, 1944, for Independent Class A and B telephone companies to file statements of their proposed methods of maintaining continuing property records was granted by the FCC June 30. At the same time the Commission ordered a conference to be held with the Independent companies, now set for August 17th, to consider means of facilitating and expediting compliance by the carriers with the requirements of the continuing property record.

The FCC action was a partial grant of the requests of the U. S. Independent Telephone Association and two Independent companies, the Nebraska Continental and the Home Telephone & Telegraph Co., of Fort Wayne, Ind., which had asked for a complete exemption of the Independent industry from these regulations for the duration of the war or a lengthy extension of the effective date for the filing of methods. Approximately 50 Independents are given this extension until next Jan. 1.

The extension of time for the filing of continuing property record plans was not, however, granted for any of the Independents which are directly or indirectly controlled by a Bell System company. These Independents which have been previously found by the Commission to be directly or indirectly controlled by the Bell System number around 40 carriers and included at least one larger Independent, like the Rochester, N. Y., Telephone Corp.

The Bell System companies and some of the Independents have already filed statements of their proposed methods of maintaining continuing property records. The continuing property records on telephone plant were required by the Uniform System of Accounts. Under Section 31.2-26 of the FCC Rules and Regulations the telephone carriers were ordered to begin preparation of the records not later than Jan. 1, 1937.

Members and guests in attendance at the 26th annual convention of the California Independent Telephone Association in Santa Monica, June 24 and 25.

California Convention Report

VOICING the theme of the 26th annual convention of the California Independent Telephone Association at Santa Monica on June 24 and 25, the organization's president, Mr. C. F. Mason, declared that the recent United Nations victories were "accomplished through careful planning, through a complete cooperation of all phases of military and economic and civilian life and this cooperation must become an ever-increasing duty and necessity as our armed forces advance toward the goal of a complete triumph over our treacherous and blood-lusting and conquest-minded foes.

In the business session of the Thursday program, A. Wardman, president of Consolidated Telephone Company at Whittier, announced that member companies, voting by mail, had re-elected the entire panel of officers and directors, thus evidencing their complete confidence in the ability and leadership displayed during the critical 1942-43 war period. Officers reelected are president C. F. Mason; first vice-president William De Carteret of Exeter; second vice-president O. E. Emley of Sunland; secretary F. V. Rhodes; treasurer James F. Campbell of Whittier. Other directors are H. F. Knapp of Sanger, J. W. Newman of Thermal, O. A. Prest of Monrovia.

Mr. Mason, in closing the president's address, said:

"That we in the telephone business have with credit played our part in Wartime Victories is attested by the repeated thankful acknowledgements we have received from high military and civil authorities. We must, however, continue to provide the high quality of service, the willingness to serve, the determination to make good every added understanding — things vital to the effective prosecution of our offensive and defensive objectives."

F. V. Rhodes, secretary of the California Association, in earnest conversation with A. Wardman, Whittier, and C. F. Mason, Santa Monica.

Opening the convention, Mr. Mason, who is president of Associated Telephone Company, Ltd. with headquarters at Santa Monica and group manager of the western properties of General Telephone Corporation, read a letter from the mayor of Santa Monica expressing his personal greeting to the delegates.

Response to the mayor's greeting was made by Irvin S. Cobb, Director of Associated Telephone Company, Ltd. Confined to his bed because of a recent illness, Mr. Cobb spoke over a special telephone amplifying system to the assembly. "It is quite obvious," he said, "that there have been no slackers, no quitters, no malingerers, no saboteurs and no double-crossers in the telephone organization from the top to the bottom. All the soldiers in this war are not in uniform bearing arms; those fellows in the overalls, those girls in the smocks and work aprons who are sticking on the job, working at high speed, under confusing, conflicting circumstances, doing what they are called on to do not only with energy but with enthusiasm and with gladness in their souls that they are contributing to the result which now appears inevitable."

More than 300 telephone executive and technicians representing the California Independents, as well as many guests from other states, were attracted to the convention by the educational nature of the program designed to give practical assistance to member companies in meeting their wartime communication problems.

Annual reports were presented by secretary F. V. Rhodes and treasurer James Campbell. Secretary Rhodes announced that five additional companies had been admitted to the Association during the past year bringing the active membership total to 46 companies. He cited specific technical services which his office has performed for member companies and expressed his appreciation to the U. S. Independent Telephone Association and to TELEPHONE ENGINEER and Telephony for the cooperative sprit with which they have aided the Association in the past year.

Mrs. Helen W. Everts, executive secretary of the American Red Cross in Santa Monica referred to the essential nature of communications in the many phases of Red Cross activity.

Closing the Thursday morning session, J. T. Naylor, executive assistant of Associated Telephone Company, Ltd., spoke on the changing philosophy in toll compensation practices. He stated that while the primary interest of the Independents is the furnishing of exchange service, or in some cases the terminating of long haul traffic, the furnishing of toll service is, nevertheless, an extremely important interest and the Independents must be alert to discover the best methods of making both exchange and toll business carry their respective expense and earnings loads. He asserted that two of the most effective tools available to the Independents in securing adequate compensation for the services they perform are uniformity of method and understanding and unity of viewpoint and objectives. Unless expensive duplicity of effort are to result we must work, not as individual companies, he said, but as a single industrial entity.

At the California convention registration desk: (l. to r.) L. B. Reed and V. E. Jones of Interstate Tel. Co.; Automatic Electric's J. K. Barrington; W. T. Taylor and R. F. Stannard of Southern California Tel. Co., and M. H. Borchardt of Associated Tel. Co., Ltd.

Director of the Communications Division of the War Production Board in Washington, D. C., Leighton H. Peebles, commented on the reasons for the restrictions in material usage. "To the telephone industry, Washington can only render thanks," he said, "Your acceptance of government direction and restrictions have been sincere and complete. In many instances, known even better to you than to me, you have succeeded in spreading the critical materials needed by your profession further than our most optimistic calculations. This has shown the full measure of your cooperation, a cooperation which is indicative of the ingenuity and intelligence of American industry in meeting and solving the problems of production for total war."

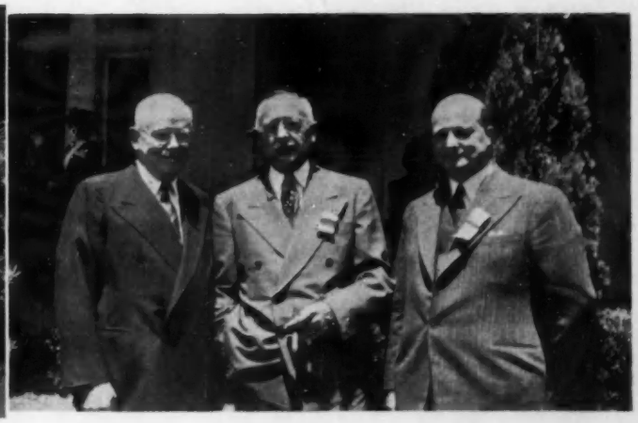
MR. HAROLD V. BOZELL, president of General Telephone Corporation and chairman of the Tax Committee of the United States Independent Telephone Association, spoke on the assigned topic of "The Revenue Act of 1942 and the Trends Toward a 1943 Revenue Act."

He pointed out that any Revenue Act under present legislative procedure was but an amendment to a long series of tax legislation. He called attention to the fact that last year the Independent telephone industry was the only one of the so-called public utility groups who appeared before the House Ways and Means Committee to point out the inequitable effects upon the Independent telephone companies which would result from adoption of the proposals originally made by the Treasury Department; and gave credit to the Executive Committee of the Association for deciding to take a definite stand in this formal manner.

He also pointed out the fundamental fact that the present system of taxing corporations in this country is in the form of double taxation on the earnings or profits of business which happens to be done through the corporate form.

After carefully explaining what he considered inequities in our present

President A. Wardman and delegates representing the Consolidated Telephone Co. of Whittier and Downey at the recent California convention.



C. F. Mason, (center) president of the Associated Tel. Co., Ltd., poses with F. N. Bush (right) and G. H. Jess, both of the Southern California Tel. Co.

C. F. Mason (right) is host for luncheon at the Miramar Hotel, headquarters of recent California convention.

R. A. Lumpkin, official representative of the USITA, Washington, D. C. was photographed as he addressed the California assembly.

tax laws Mr. Bozell said that as soon as the Tax Committee of the USITA had crystallized its definite proposals and presentations which it expected to lay before Congress it would give them circulation throughout the industry and urged universal cooperation from the industry in disseminating ideas leading to improvements in the tax structure as affecting telephone companies.

Thank You—

Glen Bosworth and John Gorin of the Assoc. Tel. Co., Ltd., for the splendid pictures of the California Convention used in this issue.

WARNING that insufficient depreciation allowance for plant replacement may create serious difficulties after the war, E. F. McNaughton of the California Railroad Commission told of post-war planning in the telephone industry. Inadequate depreciation allowances were set aside by many companies during 1942, he declared, and the deficiency is not confined to the very small companies.

Mr. McNaughton traced briefly the history of depreciation practices and theories, showing that the first steps toward effective utilities were included under California Railroad Commission jurisdiction.

"An organization such as this, an Independent telephone association, is an invaluable asset," stated Gerald Kepple, vice president and general counsel of the Consolidated Telephone Company in Whittier, California, in reference to his address on legislative matters affecting utilities. "It is worth all the time and effort it takes and is as good as fire insurance. Through this group you can approach constructively, effectively, men who represent you in legislative halls, state or national, in a more effective way that you can do as an individual and I feel that the Association as such can do it better than any other group. I think the telephone business as a whole enjoys a fine relationship with legislative bodies."

In a discussion of telephone problems arising out of the war, vice president F. E. Norris of Associated Telephone Company, Ltd. said that the Independent companies had been called upon by Washington to conserve critical materials, not because they had failed to respond to earlier calls but because of the ever increasing material shortages. "Conservation of materials during the present period must go beyond preventing waste or reusing items which ordinarily would be junked," he asserted.

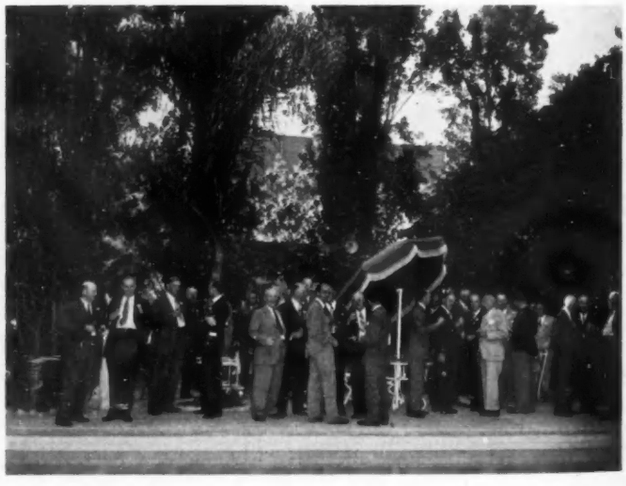
"We must in order to meet new service requirements resort to expedients which a few years ago would not have been seriously considered. To make the greatest possible saving in materials under prevailing conditions, economic rules must to some extent be compromised."

He described the operation of the surplus materials distribution plan as outlined in the letter issued by the Communications Division of the War Production Board around the first of June.

He also discussed force losses, particularly in the ranks of women employees, suggesting that an analysis of the reasons as to why such employees leave the company and where they go after leaving may give a lead as to the corrective measure to apply.

Speaking of the problems incident to the providing of telephone service for the Army, Lt. Col. M. G. Mauer, Assistant Chief, Signal Branch, 9th Service Command of the U. S. Army, told delegates that the Army needs the best possible service without delay in order to get this war over in the shortest possible time. He explained that it is the purpose of Army authorities to dispense with detail and drive straight toward their objective in securing adequate communications facilities.

(Please turn to page 52)



Telephone executives were entertained by C. F. Mason, Santa Monica, at his beautiful California home.

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Oregon Washington *Convention Report*

C. E. Hoy, Interstate Tel. Co., D. O. Hood, president of the Oregon Association, and G. W. Wells, vice president, visit the California convention at Santa Monica.

THE importance of the Independent Telephone industry to the war effort was the keynote at the joint convention of the Washington and Oregon Independent Telephone Associations held June 18 and 19 in the Davenport Hotel in Spokane, Washington.

Officers elected by the Washington Association were: president, G. J. Stover, Mount Vernon; vice president, Wade H. Dean, White Salmon, and secretary-treasurer, J. W. Baker, Spokane. Directors are: David Burr, Kirkland; Mr. Dean; Lloyd Gates, Bothell; C. E. Johnston, Spokane; R. E. Rudolph, Ellensburg; Phil Shintaffer, Lynden; D. M. Yost, Edmonds; Burns Brown, Kennewick; Ray Dalton, Everett; and G. S. Gaines, North Bend.

Officers of the Oregon Association are as follows: president, D. O. Hood, Portland; vice president, Gail Wells, Sheridan, and secretary-treasurer, Leslie A. Gritten, Forest Grove. Directors are: Ethel A. Bauman, Lebanon; Lowell Brown, Silverton; Earl Dean, Hood River; T. J. Wells, Redmond; Harley Barber, La Grande, and W. A. Schaefer, Portland.

A resolution was passed jointly by the two associations at the convention in their endeavor to obtain just and equitable compensation for the toll business developed in their territories. (See article on another page of this issue on "Pacific Coast Associations Form Coast-wide Settlement Committee").

After opening remarks and report by President Stover of the Washington Association and an address of welcome by the Honorable F. G. Sutherlin, mayor of Spokane, J. W. Baker, Washington secretary-treasurer, gave an account of the last convention.

D. O. Hood, Oregon president, discussed the present situation and the need for combined action to secure satisfactory returns for toll and TWX business developed by Independents, as well as appropriate action by The Pacific Company to carry out the terms of the F.C.C.-A.T.T. compromise settlement.

Leslie A. Gritten, popular and able secretary of the Oregon Independent Telephone Association, was again reelected.

Leslie A. Gritten, Oregon secretary-treasurer, gave a brief resume of the Oregon Association's activities. He referred to the fine informative work of the trade magazines, "TELEPHONE ENGINEER", and "Telephony", as well as the bulletins put out by the USITA and the various manufacturers who supported the work of the association. The toll settlement contract revisions, promised by The Pacific Company in 1941 as a result of continued action by the association, had been delayed by war conditions; but 44 companies had completed revised contracts with substantially better commissions, directly due to the toll settlement committee's negotiations, all of them made retroactive to April 21, 1941. The association's legislative committee had done valuable work in 1943, having effectually frustrated strong attempts to impose poleline taxation to finance a system of bureaucratic inspection.

R. A. Lumpkin, of War Activities Committee of the national association, spoke warmly of the part taken by telephone companies in assisting the war effort. He quoted the comment of a United States Senate committee —"Adequate communications facilities and the maintenance of a strong, cohesive and a far flung communications

mands for service are unprecedented, said Mr. Lumpkin, and the material necessary to meet such demands is fading away into thin air. Despite the government's designation of communications as an essential industry, men vital to its operations are inducted daily into the armed forces.

Mr. Wm. A. Givens, Supervisor, Public Utilities, Washington Department of Public Service, addressed the meeting on the subject "Departmental Activities." He said that in recent years regulatory commissions have been very sympathetic to the problems of the public service companies within their jurisdiction and that only where there is complete understanding is it possible to bring about the proper solution to the problems.

The Friday afternoon session opened with a fine discussion of wartime traffic problems by Mrs. Mayme Workman, traffic supervisor of the Illinois Telephone Association. Mrs. Workman stressed the difficulties of the personnel problem in wartime and the probability of our being saddled after the war with a large percentage of undesirable operators if due care were not taken in hiring and training at this time.

Leighton H. Peebles, WPB Communications Section Director, made an appeal for curtailment of unnecessary installations and envisioned an early stoppage of the supply of telephone instruments for ordinary civilian use. He urged that we should regard the government officials of Washington as a group of sincere men and women trying to win a war, rather than a group of muddlers. Today this country can be proud of its record of war production, said Mr. Peebles, for even half way through 1943 we know that the United States will produce more than twice the fighting equipment that can be turned out in all of Hitler's Europe.

Independent companies as well as the Bell system are cooperating splendidly in educating the public to meet the situation. Mr. Peebles paid tribute to the public for its patriotic acceptance of restrictions.

Mr. Harold Bozell, chairman of the USITA Tax Committee, discussed The 1942 Revenue Act at length (*Excerpts of his address appear in our reports on the California Convention in this issue.*)

An outstanding speech was delivered by C. N. Shaw, general traffic engineer of The Pacific Telephone and Telegraph Company. He said:

"All of the traffic problems, in whatever form they present themselves have common root causes stemming from:

"First—The extremely rapid and heavy increases in call volumes that have been brought about by the large military and industrial development of this region.

"Second—The necessity for handling these heavy volumes with minimum use of equipment requiring for their manufacture, materials critically needed by the armed forces and other industries.

"Third—The difficulty we have in common with other industries, particularly in busy war centers, in securing and retaining an adequate supply of skilled workers—in our case, of course, operators.

"Fourth—The responsibility that rests upon us to quickly find and promptly dispose of those very important war calls such as priority 'Army Flash.' Frequently we must interrupt other traffic to complete these calls."

The first afternoon concluded with a discussion of War Manpower problems by Mr. John H. Thomas, of the U. S. Employment Service.

A banquet was held in the evening with G. "Ed" Krieger, assistant general manager of the West Coast Telephone Company functioning as toastmaster.

The Saturday meeting opened with a splendid analysis of Oregon and Washington tax legislation by F. H. Young, manager of the Oregon Business & Tax Research. Mr. Young said:

"No important changes were made in the tax system of either Oregon or Washington, affecting the telephone business, by the 1943 legislators of those states. This desirable situation was the result of legislative pre-occupation with necessary state adjustment to war-time conditions, to influence of the more conservative membership of the 1943 sessions, and to the effectiveness of representatives of the Independent Telephone Associations of the two states in presenting the viewpoint of that essential business.

"While not relating to taxation, probably the most important 1943 Washington law affecting the independent telephone business was Chapter 68 which makes it possible to compel inter-line physical connections by the Department of Public Service.

"Principal Independent telephone company interest in 1943 Oregon legislation was negative in character, being limited to successful opposition to a recurring bill that proposed an added 50 cent inspection fee per mile of pole line, to defray cost of alleged needed additional safety inspection work."

Mr. F. C. Heyes, priorities manager of the Kellogg Switchboard and Supply Company, answered a variety of questions on every phase of the material priorities situation.

West Coast Associations Form Settlement Committee

Looking toward a solution of the voluminous problems involved in Pacific Coast intercompany toll settlements, the California Independent Telephone Association, Oregon Independent Telephone Association and Washington Independent Telephone Association, acting jointly, have appointed a committee to represent the telephone companies in the three Pacific Coast states and possibly in some of the neighboring states. Known as the Pacific Coast Telephone Committee on Intercompany Settlements, the membership is composed of C. E. Hoy of Interstate Telephone Company, Spokane, Washington; G. W. Wells of Northwest Telephone Company, Sheridan, Oregon; A. N. Johns of California Water and Telephone Company and West Coast Telephone Company, San Francisco; and J. T. Naylor of Associated Telephone Company, Ltd., Santa Monica. President G. J. Stover of the Washington Independent Telephone Association; President D. O. Hood of the Oregon Independent Telephone Association and President C. F. Mason of the California Independent Telephone Association are members ex officio of the Committee.

The Committee will be responsible for establishing policies and practices and coordinating efforts to obtain equitable toll compensation for every Pacific Coast telephone company. It is proposed that the Committee shall explore intercompany settlement principles and procedures to the end that Independent companies of the three western states have the benefit of expert technical assistance and advice in negotiating new toll settlements and preparing new connecting company agreements.

Positive steps are being taken by the Committee to work out with The Pacific Telephone and Telegraph Company and its subsidiaries new toll compensation rates for each connecting company, recognizing the station-to-station principles and guaranteeing such other adjustments as arose out of the recent A.T. & T-F.C.C. settlement in Federal Communications Commission Docket No. 6468.

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Can You Use Any of These Services?

1. **Advertising Service**—a specialized, no-cost advertising service to help you dispose of surplus inventory or to obtain material from surplus stocks of other companies — including telephones which may not be available from your supplier.
2. **Engineering Consultation**—to help you adapt your equipment to changing traffic conditions.
3. **Maintenance Suggestions**—to keep your equipment at top operating efficiency.
4. **"Rebuild and Return" Service**—save critical materials and help keep your old apparatus working.
5. **Operating Advice**—our operating engineers are available for consultation on operating problems.
6. **Educational Material**—a wide variety of technical bulletins are at your disposal for employee training.
7. **Emergency Equipment**—if disaster strikes, ask us to help you obtain temporary facilities.
8. **Civilian Defense**—we will gladly suggest methods for meeting telephone needs during air raids and blackouts.
9. **Our Service Men**—there is one in your neighborhood. Call on him for advice or help when you need it.

Highlights of the Communications News

(Continued from page 20)

commissioned a Colonel in the Army. Ten days later he was promoted to the rank of Brigadier General.

* * * * * * * * * *

Bell Pensions

WHILE no decision by the three judge Federal statutory court in Massachusetts is anticipated until early fall, the chances of the New England Telephone & Telegraph Co., of winning a victory over the FCC pension accounting order which ruled the Bell System companies could not charge additional accurate accruals to operating expense, were deemed quite excellent. This test case of the Bell System was argued in all day session before the Federal court in Boston during the latter part of June and the favorable chances of a victory to be based on the trends of questioning by the three judges.

The barrage of questions which were directed by the three judges, particularly by the presiding jurist, Circuit Judge Calvert Magruder, and to a lesser degree by District Judges Francis J. W. Ford and Arthur W. Healey, seemed to take a line of approach that the FCC had not proved its point that the additional accruals to the pension fund since 1937 were allocable to past operations and therefore could not be charged to Account 672 as operating expenses. The members of the Court on the basis of their questioning appeared also inclined to the viewpoint that the New England Co. test case was not directed in any way against the FCC Uniform System of accrual Account 672 in its order of Dec. 2, 1942, which directed these additional accruals to be charged against "miscellaneous income."

The Court membership in its interrogations of the FCC spokesman seemed to be disturbed over the Commission's attitude that the company would not be financially injured by the accounting order and that the Bell System Pension Plan would not be endangered by the ruling to have these accruals charged aginst income instead of the operating expenses which has been the policy since the pension plan was created in 1913. Judge Magruder, whose questioning exhibited intelligent knowledge of the pension plan, likewise banged hard at the FCC counsel on the Commission's claim that it wanted to place the telephone companies in a position of having the burden of proof in rate cases in connection with the additional accruals.

In an exceptiionally able manner, John J. Burns, former SEC General Counsel and former Massachusetts Superior Court Judge, presented the case for the New England Company. Three attorneys of telephone labor unions—Al Philip Kane for the National Federation of Telephone Workers, Thomas H. Bresnahan for the New England Federation of Telephone Operators, and George F. Drew for the International Brotherhood of Telephone Workers (plant)—drove home to the Court that the telephone employees are "pension conscious" and are fearful that the FCC ruling because of the uncertain times may menace the future existence of the plan.

Charles R. Denny, Jr., FCC General Counsel, tried to convince the three judges that the Court should not upset the "expert" judgment of the Commission in accounting matters and that the order was designed to keep the operating expenses pure.

There were some indications that the Court might feel the solution of the controversy in the placing of the additional pension accrual payments in a sub-account of Account 672 as suspended items to be determined later and definitely by judges indicated a leaning toward that method both in their interrogation of Judge Burns and Mr. Denny.

A feature point of the argument came when Judge Burns brought out that FCC General Counsel Denny had not fully developed the facts when the latter claimed that the Commission had been supported by three State Commissions in its findings on dis-allowing the additional Bell System pension accrual payments. In the case of the Washington State Commission ruling against the Pacific Telephone & Telegraph Co. the Courts had reversed the regulatory body, Judge Burns stated; the Pennsylvania Commission had imposed the disallowance in the case of the Rochester Gas & Electric Co. on the ground that consumers in 1939 should not pay for pensions to be given to retired employees in 1934 and 1935.

HE GOT THAT WAY RIDING TRAINS ON WEEK-ENDS.'

The actuarial estimates by the A. T. & T. actuary Belcher, Judge Burns contended, accurately estimated the accrual formula of the level percentage of payroll would be adequate to maintain the pension fund safely to meet future costs. If the company should cease doing business tomorrow, Judge Burns stated, all employees on pension would receive their expected retirement pay and the balance in the pension fund would be disposed in an equitable manner to those employees close to the retirement age.

Highlights of Judge Burns' argument for the company were:

1. That the Internal Revenue Bureau had not challenged these pension accruals which the FCC terms as past expenses and allowed them for tax deduction in the 1942 Revenue Act. The same program of accruals, the level percentage of payrolls, which is used by the Bell System, is that utilized by the Railroad Retirement Board of the Government and yet the FCC challenges this as not a proper operating expense. He termed the FCC argument as "sheer quibble" why items heretofore charged to expense now have to come out of income. (FCC counsel Denny contended the determinations by the tax authorities had no bearing on the rate base.)

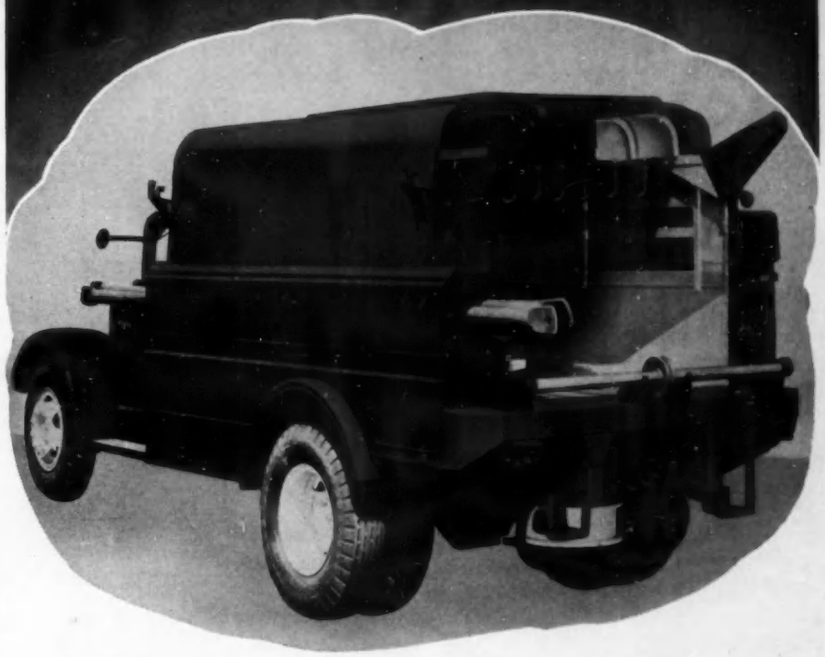
2. There seemed to be agreement by the company counsel with the view suggested by Judge Magruder that these disputed accrual payments could be put into a subaccount of Account 672 (pensions) for examination in rate cases. Emphasis was placed upon the FCC finding that the order would not hurt the company because this was no rate proceeding, but it was contended **the operating expense accounts for the New England Company would be distorted by a million dollars a year** and that in a rate case the company would be burdened with the presumption of proving these were proper expenses when they were being retained in the income accounts.

3. The heart of the case is whether these costs of pensions were allocable to past years. There is no issue as to their desirability to arrest the unfunded reserve requirements of the pension fund and the FCC agrees it is a proper step. The Commission has reasoned that this should have been started in accruals to prevent the unfunded reserve back in 1913 when the pension plan was created, but the FCC fails to explain that the ICC at that time only permitted in the Uniform System payments to pensions on the pay-as-you-go basis and that in 1927 the accrual basis was approved when it was realized due to the increased wages of World War I and larger number of employees the pay-as-you-go method would result in the future in a cost of 12% of the payroll.

As Before-so After the War-

AMERICAN *De Luxe* BODIES

Will Be Preferred Equipment For Line Construction and Maintenance



• Today most of us are in the thick of it devoting all our resources pushing production to the limit to help "Uncle Sam" end this war as quickly as possible. And "American" is proud of the part it is privileged to take in the fight for Victory.

Because of this urgent need for war equipment, "American" engineers have had but little time to develop the **new models envisioned.**

So "American" line construction bodies for the period immediately following the peace will be the same in design as those built before the war. They will embody unchanged all the time-tested features of this super-quality equipment plus greatly improved construction. For the experience gained in building thousands of bodies for the severe off-the-highway service required by our armed forces in all parts of the world, enables "American" to assure you post-war line construction equipment that will last longer and require less maintenance than ever before.

Some Reasons Why "Americans" Are TOPS:—
Correct Design • Superior Quality Construction
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As before the war so after, for top efficiency and economy you'll want "American" Equipment, and we'll be ready to make deliveries to you as fast as truck chassis are available.

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WOODLAND AVE. AT E. 79th ST. CLEVELAND 4, OHIO
PUBLIC UTILITIES EQUIPMENT FOR MOTOR VEHICLES

YOUR QUESTIONS ANSWERED FREE

Line AND Desk

Q. What would be an economical method of restoring the original wood cabinet finish of magneto subsets? We wish to avoid the trouble and expense of refinishing the cabinet.

A. There are so many different methods of renewing the finish of wood cabinets that it is hard to make a choice. However, our experience is that there are in general two kinds of finished cabinets, one using a varnish coating and the other, a lacquer coating over light or dark oak, or walnut-stained wood. If the varnish coating is still present, the surface may be sandpapered with fine sandpaper (about 5/0 grade), and then rubbed down with a metal polish containing ammonia and a chalk base, followed by wiping with a water-dampened cloth soaked with furniture oil polish. A brisk rubbing with a clean dry cloth will then result in a somewhat dull luster of pleasing appearance.

In the case of lacquer coated surfaces, a cloth soaked with lacquer thinner and used to gently wipe the surface will remove the dirt and part of the lacquer to make cracks in the finish less conspicuous. If necessary, this process may be repeated once or twice, but, since the thinnertends to soften the lacquer, the latter must be allowed to dry between wipings to preclude the possibility of removing the entire coating. Bare spots may be touched up with clear lacquer and, after the lacquer sets, rubbed down with metal polish to make the spots match the rest of the surface. After the finish has been allowed to set, the entire surface of the cabinet should be polished with dampened cloth and furniture polish and rubbed with a clean dry cloth to remove excess polish and bring out the luster.

Subsets having their finish destroyed must be sandpapered smooth, stained with the proper color, and then brushed or sprayed (preferably the latter) with a good grade of clear lacquer. All holes and dents in the surface of the cabinet should be filled with wood filler before staining. In the case of cabinets not requiring complete refinishing, hard shellac of a color matching the finish may be used to fill the holes and dents.

Q. We are anxious to preserve our drop wire plant as long as possible and understand that one way to do this is to maintain the proper amount of slack in drop wire spans. What would that be?

A. The following table gives the proper amount of slack for the lengths of the drop wire span indicated (heavy loading sections):

Span Length	Minimum Slack
60 ft.	2″
80 ft.	7″
100 ft.	30″
120 ft.	56″
140 ft.	7 ft.
160 ft.	9 ft. 6″
180 ft.	12 ft.
200 ft.	16 ft.

Q. Since copper is a scarce item of material at the present time, would it be a good idea for us to make our own copper wire ties from scrap 104 copper wire?

A. Copper wire ties can be satisfactorily made from reasonably good scrap copper wire if the wire is first straightened in a wire die (obtainable on a rental basis from a machine shop), cut to 19 inch lengths, and then annealed by a competent firm having the necessary equipment for uniformly annealing the wire lengths. The reason for straightening the wire in its hard-drawn condition is that annealed wire is too soft to be straightened satisfactorily and in addition is likely to be stretched in this process. No attempt should be made to anneal the wire by heating it over a fire or by any other such makeshift method. Fire-burnt wire makes very poor tie wires.

Q. We have accumulated a quantity of "P" type drop clamps which were considered unfit for re-use due to their having been bent out of shape when forced over drop wire insulator knobs. As these clamps are made of bronze, they are very hard to straighten satisfactorily. Isn't there some kind of tool that we can use for reshaping crooked drop clamps?

A. A simple and effective tool for reshaping crooked loops of otherwise good drop wire clamps has been in use for several years in a telephone repair shop. As illustrated in Figure 1, this tool consists of a lever arm mounted in bearing supports welded to a short piece of T-iron for clamping in a vise. The short end of the lever arm is notched to accommodate the wire loop of the clamp, and one end of the T-iron is slotted to receive the neck of the clamp. In use, the neck of the drop wire clamp is inserted in the slot and the wire loop placed over the notched end of the lever arm as shown in the illustration, and the arm is operated to straighten the wire loop. This method will quickly straighten even the most badly distorted drop wire clamp.

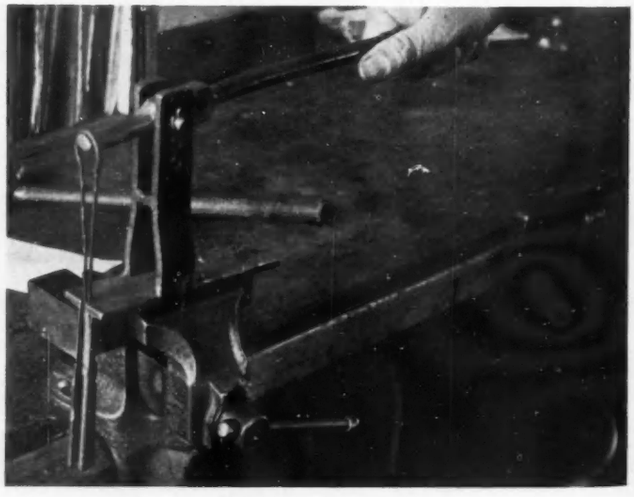

Fig. 1.—Tool for straightening drop wire clamps.

Here's Spiral-4...to speed the war

Spiral-4 is a new type of rubber-covered field cable to help the Signal Corps establish communications quickly. Borrowing the basic idea from peacetime carrier telephony, this new Western Electric product provides three telephone and four telegraph circuits in a single cable—about the thickness of a fat pencil—containing four spiralling wires.

Spiral-4 is made in quarter-mile lengths, the ends of which are fitted with weather-proof connectors. These are snapped together as the cable is payed off a moving truck. With amplifiers spaced along the way, distances up to 150 miles may be spanned.

Another plus value of Spiral-4 is that an enemy tapping this new *carrier* type cable—when carrier channels only are being utilized—would get nothing for his trouble but a mixture of squeaks and squeals!

Western Electric

IN PEACE...SOURCE OF SUPPLY FOR THE BELL SYSTEM.
IN WAR...ARSENAL OF COMMUNICATIONS EQUIPMENT.

Personalities

W. S. Robinson of the Argyle (Minn.) Telephone Company died June 16 at his home. He was owner and manager of the exchange.

●

Major W. F. Tucker, executive officer of the 92nd Signal Battalion, one of the large Signal Corps units sponsored by the Ohio Independent Telephone Association, has been assigned the command of the 302nd Signal Operations Battalion.

●

Joint application of the Missouri Standard Telephone Co., a corporation, to sell and **W. R. Trowbridge** to purchase the telephone exchange at Ava, Mo., was filed June 23.

●

Edwin B. Jury, manager of the Greenfield (Ohio) Telephone Company is president-elect of his local Chamber of Commerce.

●

Milo L. Dick has been plant superintendent of the South Coast district of Associated Telephone Co., Ltd., with offices at Long Beach, Calif. Succeeding **Mr. Dick** at his former position as installation and maintenance supervisor in that area is **Otis W. Campbell.**

●

W. A. Pankey, vice president and general manager of the Bluefield (W. Va.) Telephone Company has been honored by the West Virginia Chapter of the Telephone Pioneers of America by being made a life member. He has been with his company for 46 years and richly deserved the honors bestowed upon him.

●

David R. Eaby, son of C. E. Eaby, vice president and general manager of the Denver and Ephrata (Penn.) Tel. & Tel. Co., has been promoted to the rank of Captain. The recent injuries suffered by **Capt. Eaby** in the middle-eastern area in a jeep accident in which all members of his party were injured and one English officer was killed, were quite painful and necessitated eight days hospitalization. **Capt. Eaby**

Capt. David R. Eaby

cabled his dad "not to worry" but the Adjutant General's Department in Washington relayed the actual news. **Capt. Eaby** is back on duty although carrying several battle scars.

●

W. H. Spurlock of the service department of the Lincoln (Neb.) Tel. & Tel. Co., has four fighting sons in our armed services. Recently he received word that two of the boys—**Lyman** and **Gerald**—had been promoted from captains to majors. They are both on the fighting front. **Lyman** received considerable mention in the famous "Guadalcanal Diary." **Ivan** will soon graduate from Officers' Training School and **Norman,** 20, graduated in April from Radio Operator's School. **Papa Spurlock,** himself, served in the Navy prior to World War I and was in Officers' Training when the first Armistice was signed.

Frank Heyes and **"Marty" Bellion** of the Kellogg Switchboard & Supply Company attended the state telephone conventions on the West Coast last month. **Frank** was on the Oregon-Washington convention program and served as the expert on priorities during their Open Forum. **Marty** is supply sales manager of the company.

●

Roy L. McCallum, 47, member of the Everett (Wash.) plant staff of the West Coast Telephone Company, died May 30. He started with the company as a lineman.

●

Margaret Otstot, formerly on the staff of **H. M. Stewart,** executive of the Pennsylvania telephone association, has been commissioned 3rd Officer in the WAC. She entered service in February and was commissioned at Fort Des Moines.

●

H. F. McCulla, general commercial superintendent of the Lincoln (Nebr.) Tel. & Tel. Company, was the featured speaker at the recent meeting of the Lincoln Chamber of Commerce. His subject was on the wartime telephone industry and gave him the opportunity of informing the citizens of Lincoln of the impending shortage of telephones and other troubles of the telephone company caused by the war.

●

J. D. Kratz, Footville, Wisc., was elected as chairman at the annual meeting of the Wisconsin Locally Owned Telephone Group held recently. Vice chairmen elected were **T. H. Sanderson**, Portage, and **C. H. Wiswell** of Elkhorn. **L. M. Lamkins**, Manawa is secretary and **A. H. Bowden,** Almond, is treasurer.

●

W. M. Angle, president of the Stromberg-Carlson Company, took part in the panel discussion at the recent National Association of Manufacturers Conference on Public Relations in Cleveland, Ohio, early this month.

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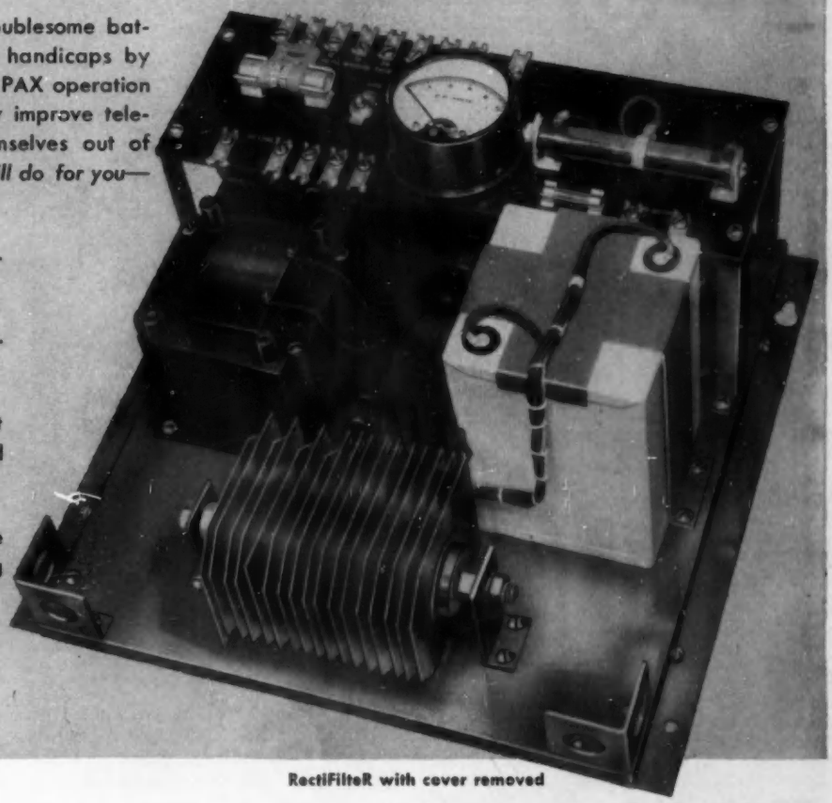
(Battery Eliminators)

Eliminate Battery Headaches in PBX and PAX Service

Raytheon RectFilteRs overcome troublesome battery maintenance and inspection handicaps by supplying DC power for PBX and PAX operation directly from the AC source. They improve telephone service and pay for themselves out of savings. *Here's what RectiFilteRs will do for you—*

- Eliminate batteries and the expense of routine service.
- Release charging pairs, for revenue producing service.
- Provide stabilized DC output voltage from no load to full load regardless of AC variations.
- Minimize power costs because of high efficiency in converting AC to DC.
- Save $30 to $90 a year.



RectiFilteR with cover removed

The coveted Army-Navy "E", for Excellence in the manufacture of war equipment, flies over all four Raytheon plants where 12,000 men and women are producing for VICTORY.

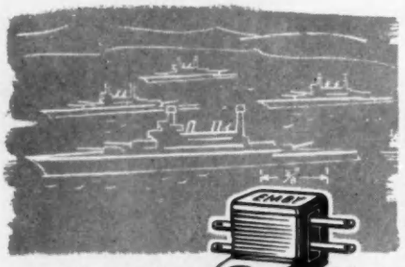
Raytheon RectiFilteRs are efficient, dependable and economical. They have *no moving parts . . . nothing that requires maintenance.* Simply plug the RectiFilteR in, close the door and from then on it will take care of itself.

RAYTHEON MANUFACTURING *Company*

190 WILLOW ST. WALTHAM, MASS.

EMBY
SELENIUM
Rectifiers
ENGINEERED
FOR ENGINEERS

N2 Input 5 volts. Half wave. Continuous dc current 1 ma. Used with meters, detector circuits, bias voltage.



D5 Input 10 volts. Full wave Bridge. Continuous dc 10 ma. Unbreakable plastic case with mounting extension.

D2 Input 10 volts. Full wave bridge. Continuous dc rating 35 ma. Mounted in aluminum case with mounting extension.

Permanent characteristics. Unlimited life. Temperature range, −70° to +70° C. Unaffected by severe atmospheric conditions. Increased efficiency with increased temperature. Sealed-off units supplied for aircraft services. Rectification is instantaneous, no warm up period required. No moving parts. Shock proof. Series N & S have satisfactory frequency characteristics and can be used in the frequency range up to 100 kc. *Immediate delivery on many types.* Available through your Electronic Parts Distributor or write:

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A. T. West

A. T. West, long identified with the telephone industry in the Northwest, has just been made president of the newly formed Northwest Chapter of the Independent Pioneer Telephone Association, according to **G. E. Krieger** who informed us of the Pioneer breakfast arranged and held during the recent convention there. **D. O. Hood,** president of the Oregon association, was elected vice president and Washington Association's secretary treasurer **J. W. (Dick) Baker** was selected to serve in the same capacity with the new Pioneer chapter. The new Chapter embraces Oregon, Washington, Idaho and British Columbia. **Ed Krieger** informs us they hope the Pioneer breakfast will be a yearly feature of their convention.

●

R. A. Guthrie, 68, well known to the Independent telephone industry and formerly owner of the Macon (Mo.) Telephone Company died June 12 from arteriosclerosis following a six months illness. He sold the Macon property in 1926 and afterwards served the Theodore Gary & Company in Kansas City until his retirement in 1933.

●

Mr. and Mrs. Lawrence Schildtknecht of New Lisbon, Ind., celebrated their golden wedding anniversary on June 6th. **Mr. Schildknecht** has been connected in an official capacity with the New Lisbon Telephone Co. for the past twenty-two years.

●

Ray Stanford, manager of the Delta County Co-operative Telephone Co., Delta, Colo., is celebrating his 40th anniversary as manager of that company. Newspapers in Colorado are carrying long stories on the history and growth of the company which consists of 6 exchanges and 30 female employees and 8 male employees.

●

R. J. Perrin, as seller, has filed joint application with **Carl O. Krohum,** as buyer, of the Perrin Telephone Company exchanges at Rhame and Scranton, N. Dak., with the state Public Service Commission.

●

Mrs. E. Worley of the Ashland (Ky) Home Telephone Company is carrying on with a smile these days. Her son, reported missing in action some months ago, is now a prisoner of war, alive and we imagine doing plenty of kicking. Her employers have commended her for her courage in working to her usual standard during the months of doubt.

●

J. N. Johnson, president of the Kentucky Independent Telephone Association, will preside at the one-day War Conference of that association to be held July 14, the day before this issue is mailed. Around 75 are expected to attend this conference which will take the place of the annual convention of "The Biggest Little State Telephone Association in the United States." We received invites from **Mr. Johnson** and secretary treasurer **Malone.**

●

A. B. Clark, general manager of the Nebraska Continental Telephone Company has retired from that position but will continue as president of that company. He is also a past president of the Nebraska Telephone Association. **W. W. Johnson,** who was district manager of the Kearney district succeeds **Mr. Clark. B. A. Bunting** of Columbus will succeed **Mr. Johnson. L. M. Johnson** is now district manager at Columbus and **M. F. Snavely** is plant superintendent.

●

R. K. Chase is now the secretary and treasurer of the Associated Telephone Company, Ltd., Santa Monica, Cal., filling the vacancy created by the military leave of **Major Harlan Holmwood.**

●

Aubrey W. Mellinger, president of the Illinois Bell Telephone Co., has been elected as a member of the Board of Trustees of Northwestern University located at Evanston, Ill.

●

Claude Williams, construction superintendent of the Southeast Missouri Telephone Co., Cape Girardeau, **Paul Brinkman** wire chief at Perryville and **Harold Evans,** exchange troubleman narrowly escaped with their lives during the recent storm and flood in their area. Their motor boat was swamped during the storms and rains and fortunately they were able to catch telephone wires which were near the sur-

face, climb to the tops of the poles which were just above the water and wait for rescue. While they were perched there a house came down on them and they had to cut the wires to keep it from breaking the wires and poles. They spent six hours on the poles until rescued by a U. S. Engineers boat.

•

Louis L. Brehmer, 82, vice president and treasurer of the Chillicothe, (Ohio) Telephone Company died recently after a short illness.

•

Major E. F. Ferguson

Major E. F. Ferguson, for many years associated with the Gustav Hirsch Organization, Columbus, Ohio, has been elevated from his former rank as Captain in the office of the Equipment Ordinator, Office of the Chief Signal Officer, Washington.

Dentist Helps Put "Teeth" in Transmitter

Through a combination of ingenuity and dentistry, an Army communication post somewhere in Africa has been restored to use. When the Signal Corps unit at the post received a powerful radio transmitter whose insulators had been badly broken in unloading, a Signal Corps lieutenant enlisted the services of an Army dental officer to patch up the damage with the cement used in making artificial dentures. So successful was the work that the radio station now chatters daily through its artificial "teeth."

Illinois Rate Cases Postponed by Commission

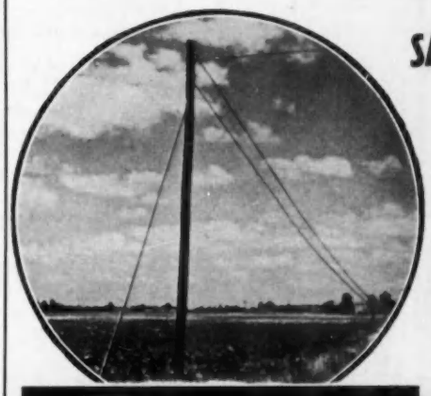
Springfield, Ill., June 16.—Effective dates of proposed higher telephone rates which the Watson & Gilmore Rural Telephone Co. seeks in Gilmore and which the Illinois Bell Telephone Co. has asked for Carrollton were postponed by the Illinois Commerce Commission yesterday to Dec. 29.

The commission said the postponement was to permit investigation of the reasonableness of the proposed increases.

J. E. Baggstrom Dies

J. E. Baggstrom, Wausa, Nebraska, former director of the Nebraska Telephone Association and for many years in the telephone business at Wausa, died June 16, in a Norfolk hospital from the effects of a paralytic stroke suffered three years ago. He is survived by his wife, four daughters and one son.

Taxes levied on the telephone business in one year are enough to buy Garand rifles for an army of six million men.



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CONSERVE MATERIALS!

NOW — more than ever — time and material are of vital importance. You conserve both when you specify **Crapo** High-Tensile Line Wire for essential new construction and for necessary replacement.

Longer, stronger spans, made possible by these high-strength wires, reduce the number of pole structures, conserve materials and save man-hours both in building and in maintenance.

Crapo HTL-85 permits spans of 225 feet in heavy loading districts; provides stronger, safer spans on existing lines.

Crapo HTL-135 makes practicable spans of 350 feet in heavy loading, 500 feet in light loading areas. Both are superior to standard B.B. wire in transmission qualities.

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In torrid heat or sub-zero cold . . . in deluge or blizzard, ***Armstrong's "Whitall Tatum" Glass Insulators*** serve without breakage or failure. Severe thermal shock tests are just one of the precision-control steps Armstrong takes to give you all-weather performance.

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use SEYMOUR SMITH TOOLS...
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A line of tools designed for linemen's use that are standard equipment with the world's largest Utility Companies.
Send for folder and prices of this labor saving equipment.
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FORWARD-LOOKING COMPANY NEEDS

ENGINEERS

A progressive company with an expanding engineering department is seeking several good men — but of course cannot take men now employed at their highest skills in war industry.

One should have a good theoretical knowledge of acoustics and experience with magnetic circuits and acoustical measurements.

Another is needed for laboratory measurements on a-f communications apparatus. He will design and supervise equipment for production testing, maintaining laboratory standards, and he should be familiar with government specifications and inspections procedure.

A third man must be familiar with the application and molding techniques of plastics. He should have several years of design experience on small electrical apparatus and an understanding of magnetic and electrical circuits.

These men will be concerned now with war contracts and planning post-war developments in a technically expert organization that's going places. Write, phone or wire the Chief Engineer, giving background and salary requirements.

Great American Industries Inc.
70 Britannia St., Meriden, Conn.

Electrical Fundamentals For the Telephone Man

(Continued from page 27)

90% of all electrical computations involve the following three principal electrical units:

The Volt—(unit of electrical pressure) Analogous to water pressure.

The Ampere—(unit of electrical current flow) Analogous to rate of flow.

The Ohm—(unit of electrical resistance). Analogous to the resistance offered to the flow of water by the internal walls of a pipe.

Analogy to Water System

IT is easy to get a proper conception of the volt, ampere, and ohm if we will but think of the action of electricity flowing in wires as being analogous to water flowing in pipes. In a water system it is the pressure (pounds per sq. in.) behind the water which causes it to move through the pipes, and it is the sides of the pipe which offer a resistance to the water flow. High pressure is built up in order to force the water through the pipe by pumping it into standpipe or by using high pressure pumps. Figure 43 illustrates the analogy between a water system and an electrical system.

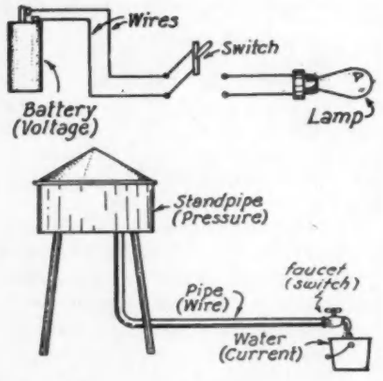

Fig. 43. — Similarity between Hydraulic and electrical systems.

In an electrical circuit consisting of a source of electricity connected to a closed metallic path, it is likewise necessary that an **electrical pressure** be available to force an **electrical current** through the **resistance** which any metallic conductor will always offer. As stated above, in electrical circuits, **the pressure is designated by the term volts, the rate of current flow by the term amperes, and the resistance by the term ohms.**

Definition of Volt, Ampere, and Ohm

IT is the voltage (pressure) which forces the amperes (current) through an electrical circuit against the ohms (resistance) offered by the conductor through which the current passes. No current can pass in an electrical circuit unless a voltage exists to force the current through the circuit. Likewise, no electrical circuit has zero resistance, although, in many cases the resistance may be so low as to be considered as virtually zero. We may think of current as an invisible fluid which flows in an electrical circuit and which is forced through the circuit by the voltage of that circuit.

By definition, the **volt is defined as that potential which will cause one ampere of current to flow through one ohm of resistance.**

The **ampere is defined as that current which will flow in a circuit of one ohm resistance when one volt is impressed across the circuit.**

The **ohm is defined as that resistance offered by a circuit which passes one ampere of current when one volt is applied.**

The precise value of the volt, ohm, and ampere is fixed by international standards, and is not of interest to the practical technician.

Ohm's Law

ONE of the most important of all electrical relationships is OHM's LAW. This law, which states the quantitative relation between the volt, ohm, and ampere, was established by George Simon Ohm in 1827. It is the most indispensable and useful of all the laws governing electrical circuits. Ohm's Law states as follows:

The intensity of current in amperes in any electrical circuit is numerically equal to the potential in volts impressed across the circuit, divided by the resistance of the circuit in ohms.

Figure 44 illustrates an easy way to memorize the three variations of Ohm's law.

This law is expressed in equation form as follows:

Fig. 44. — Ohm's Law memory aid. Place finger over unknown factor. The remaining factors show operation to be performed.

$$I = \frac{E}{R}$$

Where:
I = Amperes
E = Voltage
R = Ohms

Note. The above equation merely states that to find the current (in amperes) in any circuit we must divide the voltage (in volts) by the resistance (in ohms).

Ohm's Law Equations

IF the current and resistance are known and it is desired to find the voltage causing this current to flow, the following equation applies: (Note. This equation states that the voltage across a circuit equals the current times the resistance).

$$E = I R$$

If the voltage and the current are known and it is desired to find the resistance, the following equation should be used: (Note. This equation states that the resistance (in ohms) of any circuit equals voltage (in volts) divided by current (in amperes).

$$R = \frac{E}{I}$$

Three Practical Examples

The following three examples illustrate the use of Ohm's Law:

1. What current will an electric light, having a resistance of 10 ohms, draw when connected to a 100 volt source of electricity?

$$I = \frac{E}{R}: \quad I = \frac{100}{10} = 10 \text{ amperes.}$$

2. What is the resistance of a motor which will allow 5 amperes to flow through it when connected to a 50 volt source?

$$R = \frac{E}{I}: \quad R = \frac{50}{5} = 10 \text{ ohms}$$

3. What voltage will be required to force 5 amperes through a 100 ohm light?

$E = IR$: $E = 5 \times 100 = 500$ volts.

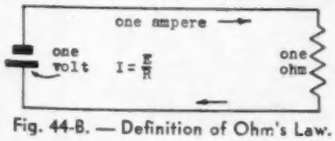

Fig. 44-B. — Definition of Ohm's Law.

Electrical Power—The Watt

ONE other electrical unit with which the student experimenter should be familiar is the **watt** which is **the unit of electrical power.** The power in an electrical circuit is analogous to water power, which equals water flow times water pressure. In an electrical circuit, the **power equals current flow in amperes times pressure in volts.** In other words, to find the power in an electrical circuit, we merely **multiply the current flowing in that circuit, by the voltage across the circuit, which gives us the power in watts.**

A practical example is as follows:

1. If an electric stove draws 10 amperes when connected to a 110 volt circuit, what power does it consume?

Where: P = watts
I = amperes
E = volts

$P = I E = 10 \times 110 = 1100$ watts

Simple Power Equations

IN addition to a knowledge of Ohm's Law, the student should also understand the use of the power equations which enable us to compute the power consumed in an electrical circuit or to find the magnitude of voltage, current, or resistance when the power and one of these factors are known.

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PINE POLES

For greater strength and outside plant economy, choose American Creosote Works' southern yellow pine poles.

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Because it is the most efficient, most economical
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The simplest power equation states that the power in volts in any circuit is equal to volts times amperes.

This equation may be written in three forms, viz:

(1) $P = IE$ (to find power)

(2) $I = \frac{P}{E}$ (to find current)

(3) $E = \frac{P}{I}$ (to find voltage)

when: P = power in watts
I = current in amperes
E = voltage in volts

Equation No. 2 shows that we must divide the power in watts by the voltage to get the current.

Equation No. 3 shows that we can find the voltage across the circuit by dividing the power in watts by the current in amperes.

Current Squared Power Equations

ANOTHER very useful power equation is that which states that the power in volts consumed in any circuit is equal to the current squared times the resistance of the circuit. This equation can be written in three forms, viz:

(1) $P = I^2R$ (to find power)

(2) $I = \sqrt{\frac{P}{R}}$ (to find current)

(3) $R = \frac{P}{I^2}$ (to find resistance)

where: P = power in watts
I = current in amperes
E = voltage in volts

Equation No. 2 shows that we divide the power in watts by the resistance in ohms and then extract the square root of the quotient obtained in order to find the current in amperes.

Equation No. 3 shows that we divide the power in watts by the current squared in order to find the resistance in ohms.

Voltage Squared Power Equations

WE HAVE one other type of power equation which is often useful to us. It states that the power consumed in an electrical circuit is equal to the voltage squared divided by the resistance. The three forms of this equation are:

$P = \frac{E^2}{R}$ (to find power)

$E = \sqrt{PR}$ (to find voltage)

$R = \frac{E^2}{P}$ (to find resistance)

Equation No. 2 states that the voltage is equal to the square root of power times resistance.

Equation No. 3 states the resistance is equal to the voltage squared divided by the power.

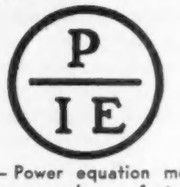

Fig. 45-A. — Power equation memory aid. Place finger over unknown factor. The remaining factors show operation to be performed.

The Kilowatt

WHERE a large number of watts is dealt with, it is customary to reduce them to kilowatts for convenience in avoiding large numbers. **A kilowatt is 1000 watts.** "Kilo" is a Greek word meaning thousand.

Electric motors are generally rated in horsepower rather than in watts or kilowatts. **One horsepower is equivalent to 746 watts.** A ¼ horsepower motor would have a rating of ¼ of 746 or 186½ watts.

Figure 46 illustrates the quantitative significance of the watt as an electrical unit.

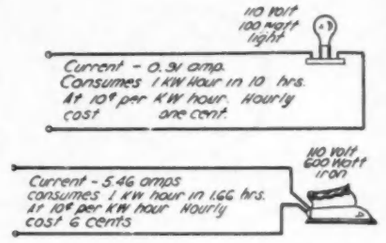

Fig. 46. — Illustration of the practical significance of the watt.

The Kilowatt Hour

COMMERCIAL power is sold by the **kilowatt hour,** one kilowatt being that amount of power consumed by a 1000 watt load if connected to the power supply for one hour. For example, 10 one hundred watt lights would represent a 1000 watt load. The

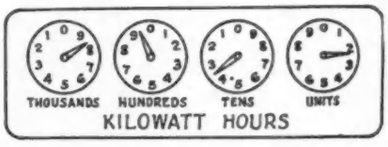

Fig. 47. — Recording dial on kilowatt hour meter (Reading is 8,932).

UNITED NATIONS FACTS
UNITED NATIONS LIFELINE
80% OF NORWAY'S FLEET, FOURTH LARGEST IN THE WORLD, ESCAPED THE NAZIS, NOW CARRIES UNITED NATIONS MEN AND SUPPLIES ON ALL OCEANS!
TORMENT BY TELEPHONE
A NAZI LEADER RESPONSIBLE FOR MANY EXECUTIONS, GOT NO SLEEP UNTIL HE ORDERED ALL PHONE BOOTHS SHUT AT NIGHT. REASON: NORWEGIAN PATRIOTS KEPT HIM AWAKE ALL NIGHT WITH CALLS REMINDING HIM OF THE MEN HE MURDERED!
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average rate per kilowatt hour ranges from 1 cent to 15 cents depending on the locality and the amount of power used. Figure 47 shows the recording dial on a common kilowatt hour meter such as is in universal use in this country for measuring the power taken by the consumer. If it is desired to know how much power is used on your lighting circuit from day to day, it is only necessary to record the existing reading and then subtract this reading from the higher reading which will be obtained at some later period.

Reading a Kilowatt-Hour Meter

AN electric kilowatt hour meter consists of a small motor which runs only when power is being consumed from the line. This motor is connected to a series of cog wheels which register the exact amount of power consumed.

The power company reads these meters monthly and then substracts the reading for the previous month from the present reading in order to determine the amount of power consumed during the last month.

There are four dials on the meters ordinarily used and the dials are arranged so that the left hand dial reads in thousands of kilowatts, the next dial in hundreds, the third dial in tens, and the last dial in single kilowatts. Therefore, for every kilowatt of electricity used, the right hand dial will move one division and the other three dials will move one tenth, one hundredth and one thousandth of a division respectively.

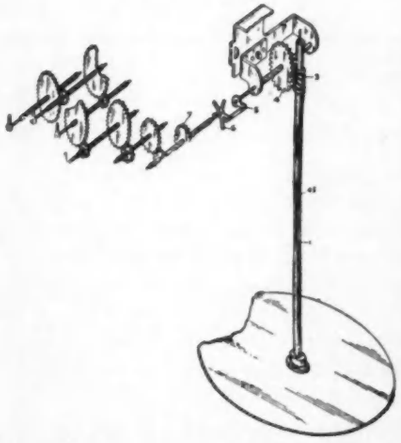

Fig. 49. — Gear train of kilowatt hour meter

Figure 49 shows the recording gear train of a Sangamo Kilowatt Hour Meter.

Newer meters are available known as the **cyclometer** type which are direct reading, i. e., the amount of power consumed shows up before four small windows on the dial.

Anyone should be able to read their own meter. The only difficulty comes in determining the correct reading when the hand is almost, but not quite, on a number. This should cause no trouble if one will just remember that all of the hands start at the same point, i. e., zero. Therefore, to determine what a hand (which is quite close to a number) really reads, just look at the position of the dial to the right of it. The meter dial shown in Fig. 47 shows 8932 kilowatts.

Definition of Term Circuit

AN electric circuit is the **closed conducting path** over which electricity passes in transferring energy from a source of power to some electrical device. The term "circuit" is broadly used to include all types of wiring arrangements, both simple and complex. For example, we refer to wiring circuits, radio circuits, etc.

The student is interested mainly in the basic facts concerning circuits and should learn that all circuits fall into

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Which Meets the Demands of Wartime

Sub-Cycle is built for heavy duty and will stand up under the most severe operating conditions.

Sub-Cycle relieves maintenance men since there are NO MOVING PARTS TO ADJUST and it requires no routine maintenance.

Other features of Sub-Cycle:

★ Economical in operation.
★ Quiet.
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★ Output voltage regulation between no load and full load is very close.
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The Never-Creep has only two pieces—rod and plate. It is easy to install and does a real holding job.

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SYLVANIA TUNGSTEN TELEPHONE SWITCHBOARD LAMPS

FASTER—Light up in one-fifth second.

BRIGHTER—Maximum end-on candle power. Sharper daylight signals.

STRONGER—Average life 1,500 hours of high brilliancy. Strong breakage resistant filament. Tight, correctly formed bases.

Available in: CLEAR
NATURAL RUBY*
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**While present supply lasts*

SYLVANIA
ELECTRIC PRODUCTS INC.
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Formerly Hygrade Sylvania Corporation

two definite classifications which are:

(1) **The Parallel Circuit** (also referred to as the shunt or multiple circuit).

(2) **The Series Circuit**

We may occasionally encounter combinations of these two types of circuits which are referred to as **series-parallel,** or **parallel-series** circuits.

The Series Circuit

BY definition, a "series circuit" is one in which **all the electrical apparatus involved is connected in the circuit in such a manner that the same current must flow through all of the devices in the circuit.** Figure 50 illustrates how apparatus, for example, electric lights would be connected in series. This type of circuit is actually used in many towns for street lights inasmuch as it has certain advantages over the parallel type of circuit for street lighting.

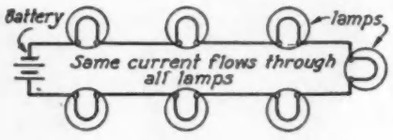


Fig. 50. — A series electrical circuit.

In a series circuit the voltage across the input to the circuit will always equal the sum of the separate voltages across each of the devices which are connected in the series. The current in a series circuit, however, is identical in all of the devices inasmuch as they are in series.

The Parallel Circuit

IN A "parallel circuit" the electrical apparatus is connected across or in parallel with the two sides of the circuit, as shown in Figure 51. It is apparent from a study of this figure that all **apparatus in a parallel circuit receives the same voltage.** However, the current in the various pieces of apparatus in a parallel circuit may differ widely and will depend on the resistance of each separate item connected. If the resistance of a connected device

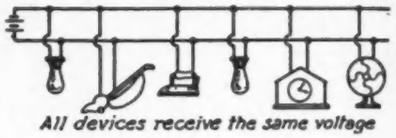


Fig. 51. — A parallel (multiple) electrical circuit

is high, the current through it will be low, and conversely, if its resistance is low, the current through it will be high.

The parallel type of circuit is much more widely used than the series type. Familiar examples of parallel circuits is the ordinary house lighting circuit in which two 110 volt wires are extended throughout the house. Lights and outlets are connected in parallel to these two wires, so that all lights and appliances receive the same voltage. The current taken by each device will vary according to its resistance.

EXAMINATION NO. 3

Conductors, Insulators, and Electrical Units

1—What is the difference between a conductor and an insulator? In what classification is water?

2—What is the difference in character between the wire used for house wiring and that used for carrying power from power lines to houses?

3—What is the diameter in mils of a No. 12 wire and how many ohms would 100 feet of this size wire have?

4—What are the three principal electrical units? Define each.

5—A 110 volt 40 watt light consumes 0.37 amperes when connected to a 110 volt line. What is the resistance?

6—How much voltage will be required to pass 5 amperes through an electrical heater whose resistance is 25 ohms?

7—What current will flow through a motor whose resistance is 5 ohms if it is connected to a 220 volt circuit?

8—How much current does a 100 watt 110 volt electric light bulb draw?

9—What is the resistance of a 25 watt electric light bulb of the 110 volt type?

10—What is the difference between the watt, the kilowatt, and the kilowatt hour?

Computing Circuit Resistance

IT IS important that one be able to compute the resistance of paral-

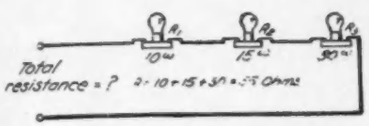


Fig. 52. — Computation of resistance of a series electrical circuit.

lel and series circuits. **The resistance of a series circuit can be obtained by adding together all of the separate resistances of each device connected in series,** as shown in Figure 52.

Computation of the resistance of a parallel circuit is much more complicated.

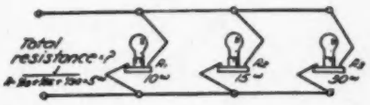


Fig. 53. — Computation of resistance of a parallel electrical circuit.

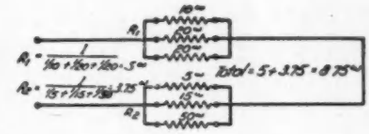


Fig. 54. — Computation of resistance in a series-parallel circuit.

To compute the total resistance of a parallel circuit each of the separate resistances must be divided into 1.0. The sum of all the separate divisions is then divided into 1.0 which gives the total resistances. In Figure 53 for example:

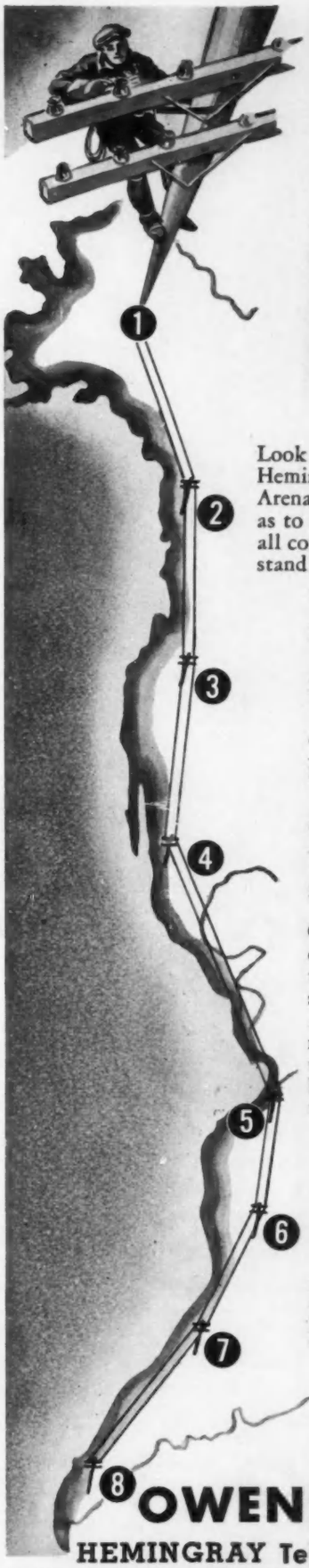
$$R = \frac{1}{\frac{1}{10} + \frac{1}{15} + \frac{1}{30}} = 5 \text{ ohms}$$

Occasionally one encounters what might be termed a **series-parallel circuit.** The resistance of such a circuit is computed by adding the total series resistances of each series branch and then adding the total resistance of each branch connected in parallel. This is shown in Figure 54.

(TO BE CONTINUED)

Priority on Phones in Cuba

On June 14 telephones were put on the priorities list by the Cuban Public Service Commission because of a shortage of materials. Newspaper reports from Havana state that army navy, police, government offices, diplomats, newspapers, hospitals, and other indispensable services will be given perferences on new installations.



TOUGH!

. . . year in year out Hemingrays live through the worst weather Nature can unleash

Look at the tough and varying weather that Hemingrays encounter between Alaska and Punta Arenas. On this imaginary line (imaginary only as to exact location—Hemingrays *are* in service in all countries shown) these famous insulators withstand . . .

1 . . . from 60° below to 90° above

2 . . . the temperature changes of mountain and valley

3 . . . from 18° below in mountains.—115° above in valleys

4 . . . attacks of tropic heat, rain, storms

5 . . . rigors of spanning 7 Andes peaks—19,000 feet high

6 . . . tropical aridity

7 . . . varying regional-temperature changes

8 . . . attack of extremes of damp and cold

Can a glass insulator stand that? Hemingrays can. Using A. S. T. M. procedure, a recent test of stock Hemingrays by Purdue University showed a strength of 3,000 lbs. Fact is, a 100-year old Hemingray insulator could be remelted and made into another insulator that, in turn, would last another 100 years, because time does not affect the structure of their glass.

Sold *only* through principal jobbers.

Hemingray No. 42 . . . favorite for toll lines—its long leakage path keeps rural "toll" lines trouble-free.

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HEMINGRAY Telephone & Telegraph Insulators

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A Flag with 46,200 Stars

THE service flag of the Bell System had 46,200 stars on May 1. It has a lot more now. Telephone men and women are serving with the armed forces everywhere.

Those who are right in the middle of the fighting realize especially the importance of the telephone job back home.

"Tell the gang," their letters say, "to keep on plugging.

"We wouldn't have the stuff for fighting if the rest of the Bell System wasn't sticking to the job and pushing through the calls that get things done.

"Takes team-work to win a war — especially a big one like this."

BELL TELEPHONE SYSTEM

★ *Your continued help in making only vital calls to war-busy centers is more and more essential every day.*

"Telephone service" takes on a new meaning

"Service to the Nation" has taken to posts in far corners of the world even more thousands of telephone folks than honored on this flag. They are all working and fighting together to help win this war quickly. This spirit encourages those at home to do an even better job—and to promote co-operation by telephone users, too.

This service flag advertisement will appear in national magazines during August.

AN

ADVERTISEMENT

OF THE

BELL TELEPHONE

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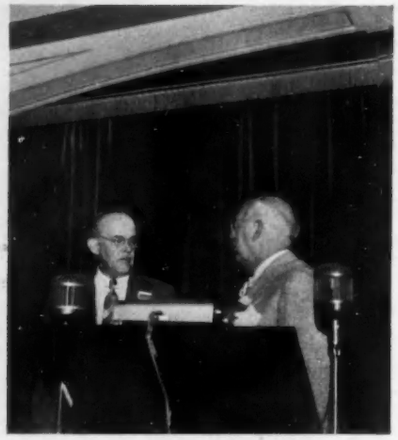
California Convention Report

(Continued from page 30)



C. F. Mason introduces Leighton H. Peebles, Director, Communications Division of the WPB, Washington, D. C., who addressed the California delegates.

In a discussion of problems of women telephone employees, Mrs. Mayme Workman of the Illinois Telephone Association, sketched the major problems created by war as force turnover, shortage of facilities, recruiting difficulties, work regulation, personnel and absenteeism.

REPRESENTING the United States Independent Telephone Association, R. A. Lumpkin, Mattoon, Ill., and of the WPB in Washington, said in part:

"A Post War Planning Committee in any industry must do much more than merely gaze into the translucent depths of a crystal ball. For the telephone industry such a committee must examine not only all of the known potentialities, it must make allowances and projections based on developments of a rather speculative nature. Included therein is the magic of electronics as well as television. But in the transition period from War to Peace near term projections can be made on a logical basis assuming, of course, that the nation's economy can be operated without serious maladjustments." He presented statistics from Postwar World War I.

Of his duties at WPB Mr. Lumpkin said:

"As many of you know, I have been an employee of the War Production Board for the past 16 or 17 months serving in an advisory capacity to the Communications Division. As such, I am on leave of absence from a Telephone Company in Illinois which I have been attempting to run meantime by remote control. When it has been necessary for me to take a stand on controversial matters affecting the operation of the telephone business, I have often times been asked, rather jestingly, "Which beard are you wearing today, that of the government or that of industry?" Let me make it definitely certain that in my remarks today I am adorned with an industry zitz. Otherwise, my words would have been first subjected to the censoring scrutiny of the O.W.I."

In speaking of this and the other telephone publication, he said:

"I am eager at this time to pay tribute to the industry's trade journals for the current excellence of their work. They have been unstintingly generous in the amount of space devoted to the dissemination of information whenever requested by the industry. They have been arduous in their efforts to print all the news helpful to our operations. They warrant increasing support from the industry itself and I urge that their pages be read from cover to cover."

Norma Ledbetter, Consolidated Tel. Co., Mrs. Grant Smith, Rubye Valantine and Martha Anderson of Associated Tel. Co., Ltd., left to right at the registration desk, accept the first registration from A. Wardman, Whittier, while F. V. Rhodes, Association secretary, looks on.

(L-R) R. K. Chase, John C. Abell and George Jones, all of Associated Tel Co., Ltd., pose with R. J. Haddon, Southern California Tel. Co., Attorney Harry Dunn, and George D. Moe, of Associated Tel. Co., Ltd.

Wm. (Billy D.) De Carteret, new president of the California Independent Pioneers, and smiling Mrs. De Carteret.

California Pioneers

The business session of the California Chapter, Independent Pioneer Telephone Association met the afternoon of the first day of the recent California convention and elected Wm. (Billy D.) De Carteret, president of the Exeter (Cal.) Telephone Company and a veteran of more than 50 years in the telephone industry, as president.

Captain George S. Blake, now on military leave from the Associated Telephone Co., Ltd., was re-elected vice president and Grant Smith, also of the Associated company, became secretary-treasurer. Elected to the executive committee were: C. F. Fairly of The Kellogg Switchboard & Supply Co.; F. H. Wright and C. E. Scott, district managers of the Associated company; and A. N. Johns of the California Water and Telephone Co.

In order to preserve in history the origin and development of independent telephony in the State of California, President A. Wardman appointed an historical committee to trace the past of Independent telephone companies. Serving on the committee will be chairman Frank H. Wright, A. B. Fry, T. H. Gould, Ted Fisher, A. Wardman and Carl H. Lorbeer, each of whom has had forty years of service or more in the industry.

(The Editor acknowledges with thanks the assistance of Grant Smith of the Assoc. Tel Co., Ltd., in bringing you this report.)

Paper For Directories Gets Attention by USITA

THE July 1 Bulletin of the United States Independent Telephone Association gives a report of that association's activities on paper for directories. Feeling their statement will be of interest we reproduce it herewith:

"Using information collected from various Independent telephone companies throughout the country we recently presented to the Printing and Publishing Division of the WPB a requested report of economies in paper conservation which are being practiced in the Independent field. The data presented indicated paper savings of from 10 to 15%, with some instances higher and one as high as 42%.

"The WPB was appreciative of the conservation policies of the Independent companies and asked that the good work be kept up. Two further requests have now been made by it viz: (1) Reduce the use of inserts sent out with monthly bills, and (2) cut down on the number of wire stitches used in telephone directories where possible.

"The second request is based on the fact that many directories (even relatively small ones) are still using four stitches when three or even two would be ample. In some cases an extra stitch is used merely to hold an advertising insert. This the Printing and Publishing Division considers a bad practice.

"An order (L-291) which placed certain restrictions on the use of wire stitches was issued in May but has since been revoked. The WPB is now working on another order of this type. It would be helpful to us if those companies that have adopted or will adopt new practices in directory stitching will write us promptly outlining the nature of the savings. This information will enable us to make a plea to the WPB for insertion of the "functional printing clause" in order to exempt telephone companies from new restrictions as to directory stitching.

"We shall be especially glad to hear of both paper and stitching savings in the directories of companies which have not so far communicated with us.

"Our negotiations with the Printing and Publishing Division of the WPB have been carried on in cooperation with our War Activities Committee."

Obituary

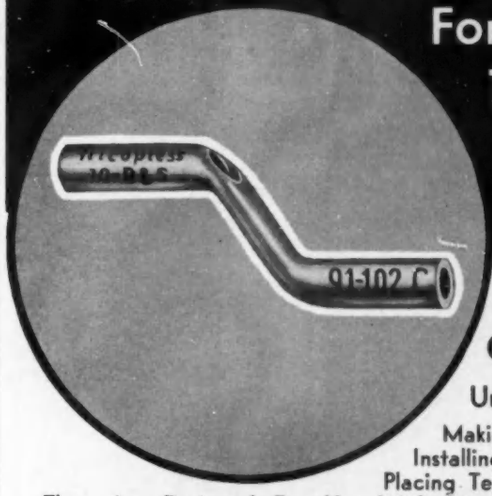
H. A. Patterson, president of the Mankato (Minn.) Citizens Telephone Company, who has been president of that company since 1906, died after a short illness June 26th. Mr. Patterson, in spite of his large interests in the wholesale grocery business extending into four states, took vital interest in Independent telephony. Director and officer in many businesses and civic enterprises, local and state, he was widely known over this northwestern section as one of its leading business men but never too busy to overlook his keen interest in civic affairs.

Being an active member of the Kiwanis Club he presented a camp site and lodge hall on beautiful Lake Washington to the club to be operated as a camping site for the youth of the community, this being only one of his many charities. Camp Patterson is a popular spot during the summer months and an enduring monument to Mr. Patterson who loved young people and out-of-door life.

***

The first telephone advertisement, printed 65 years ago, offered for rental "telephones for the transmission of articulate speech through instruments not more than 20 miles apart."

Speaking of STAMINA—
For Long-Lasting Trouble-Free
DEAD-ENDS
Install
Nicopress
OFFSET DEAD-ENDS



Unexcelled For,
Making Open Wire Terminations,
Installing Drop Wire Connections,
Placing Test Points In The Line.
They Are Designed For Use With Pin, Strain, or Spool Insulators.

Some of the many reasons why Nicopress Offset Dead-Ends have met with wide popularity and are delivering unfailing satisfaction over long periods of time are:—

Strength and tightness of completed connection. They exceed the rated breaking strength of the wire—the conductors cannot pull out—and they are designed to stand up under vibration.

Simplicity and speed of installation. Any lineman can quickly do a neat job without danger of damaging the wire.

There is **provision for a tail of any desired length** to which tap-offs may be easily attached.

Nicopress Dead-Ends save time and money and assure durable, trouble-free connections.

ORDER *Nicopress* DEAD-ENDS FROM YOUR DEALER

THE NATIONAL TELEPHONE SUPPLY CO.
5100 SUPERIOR AVENUE • CLEVELAND, OHIO
Canadian Manufacturer — N. Slater Company, Ltd., Hamilton, Ontario, Canada
Export Distributor — International Standard Electric Corp., New York, N. Y.

F. M. Hoag Passes

F. M. Hoag, 63, who retired in 1938 as vice president of the Southwestern Bell Telephone Company after 40 years service, died June 3 at his home in Dallas, Texas. He was a familiar figure to both Independent and Bell Company people.

Entering the telephone business at the age of 17 Mr. Hoag served as a cable helper with the old Cleveland Telephone Company where he immediately started up the ladder to his ultimate success. He moved to Texas in 1903 after he had been made general foreman in charge of construction at his first location. His service in Texas included all portions of the state as he engineered many installations while there. In 1917 he was named division plant superintendent and officed in San Antonio where he supervised numerous military installations during World War I.

After the Armistice his work included rate cases and successively positions in the Oklahoma area culminating as assistant general manager of that state. He succeeded E. F. Carter as manager for Texas in 1921 and served until 1926 when he was appointed general commercial manager for the entire property. Two years later he was elected vice president in charge of commercial matters with offices in St. Louis. He returned to Dallas to live following his retirement. He is survived by Mrs. Hoag and two daughters.

F. R. McMurry Dead

Fred Russell McMurry of Westwood, N. J., who served on the technical staff of the Bell Telephone Laboratories, died June 28 at the age of 62. He began his career with the New York Telephone Co. in 1904, later entering the engineering department of the Western Electric Co., which became the Bell Laboratories in 1925. From 1914 until 1931 Mr. McMurry worked on the development of printing telegraph apparatus, and since 1931 had charge of maintaining all technical contacts with the Teletype Corporation of Chicago. He was born in Normal, Ill. and is survived by a widow, the former Nettie Lawrence, and three sons.

Wisconsin Exchange Sold

During May a transaction was completed whereby the Morgan Telephone Company was taken over by the Oconto (Wisc.) Rural Telephone Company. Chris Hermsen, Oconto, is the general manager and all business will be handled through him.

TELEPHONE PROPERTY OWNERS

Representing Capital for Investment

Would like to consider purchase of or entering into partnership arrangement with principal owner covering acquisition of entire common stock issue or working control of reasonably sized telephone company. Balance sheet and factual data as to operating property should be submitted. Replies confidential.

Address: Box No. 8296
% Telephone Engineer
7720 Sheridan Road
Chicago 26, Illinois

Safety Magazine Issued By Southeastern Company

The June issue of "Southeastern Telephone Safety" issued for the employees of the Southeastern Telephone Company, Tallahassee, Fla., is a very informative little publication edited by E. M. Menendez, safety director.

Besides carrying personal notes, safety items etc. the June issue reprinted a page from a recent TELEPHONE ENGINEER titled 10 Husky Linemen. The editorial in the issue asked a very pertinent question—CAN YOU OPERATE A FIRE EXTINGUISHER? Well, can you? It will be too late to learn after a fire starts!

California Company Publishes Descriptive Pamphlet

Recently issued by the company, a 24-page booklet presents the story of Associated Telephone Company, Ltd. in pictures and text. The pamphlets were distributed to graduating women students in high schools in company territory and were addressed to each member of the company personnel. Additional copies are available and may be obtained by directing a request to the executive department in Santa Monica.

Among company camera fans whose pictures enhanced the appearance of the little magazine are John Gorin, Santa Barbara draftsman; Harry Cline, Camp Cooke combination man; Glen Bosworth, Santa Monica machine operator; and Betty Evans, wife of Santa Monica installer, Bob Evans.

Pictures represent all departments and every district, the inside back cover showing the district headquarters buildings, and the back cover a reproduction of the Vail Memorial Plague awarded to employees of the company following the Long Beach earthquake of 1933.

Essay Contest

A 100 dollar war savings bond is the first prize offered in the essay contest now being sponsored by Associated Telephone Company, Ltd., and San Joaquin Associated Telephone Company for all employees compensated under a daily wage schedule.

That interest is strong among potential contestants is evidenced by the comments and sets of rules distributed during the early stages of the competition.

To enter the contest, employees need only submit a 300 to 500 word essay on the subject "Why I Like My Telephone Job as a Wartime Occupation," either by U. S. mail or to the local president of the union, the district manager, or persons designated by the district manager, on or before July 20.

In addition to the first prize, two other grand prizes, one a 50 dollar war savings bond, and the other a 25 dollar war savings bond, are offered. District prizes of 10 dollars in war savings stamps, and of 5 dollars in war savings stamps will also be awarded in individual districts.

Twenty-one prizes will be awarded in all, ranging from the 100 dollar war bond to 5 dollars in war savings stamps. It is essential that all entries be submitted before 5 p.m. on Tuesday, July 20. Each essay then will be coded and the author's name will not be known to the panel of judges, but it will be considered in accordance with the specifications listed below.

The elements which will be considered in judging the quality of essays will be (1) adherence to the theme of the title, (2) originality of ideas, (3) number of ideas, and (4) general appeal of the thoughts and tone of the essay and adaptability to publication. Judges will be fully qualified impartial persons who have no connection with the company, named by the general committee of the Independent Telephone Employees Organization.

Mimeographed sets of contest rules may be obtained from union presidents, district managers and persons designated by district managers.

Toll Calls Almost Doubled

Long distance telephone calls handled by the American Telephone & Telegraph Co. nearly doubled in the past two years, A. T. & T. Vice-President Mark R. Sullivan in charge of operations wrote in the June issue of the Bell Telephone Magazine. During the same period, Mr. Sullivan noted, 150,000 new operators were added to handle increased traffic and as replacements among the operating staff. The A. T. & T. executive wrote that the two-year increase in traffic is almost equivalent to the total level of business reached by the company over a period of 65 years.

25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of June, 1918.

On July 1, 1918, President Wilson recommended to Congress that the government control and operate the nation's telegraph and telephone systems.

•

Over 500 operating telephone men attended the third annual convention of the United States Independent Telephone Association held in Chicago, June 25 to 28, 1918. The large attendance in the face of many difficulties was credited to the anxiety of Independent operators to obtain all the guidance and advice that could be had by mingling with their fellow workers. Because of the seriousness of the national situation, no banquet was held and all official entertainment features were omitted.

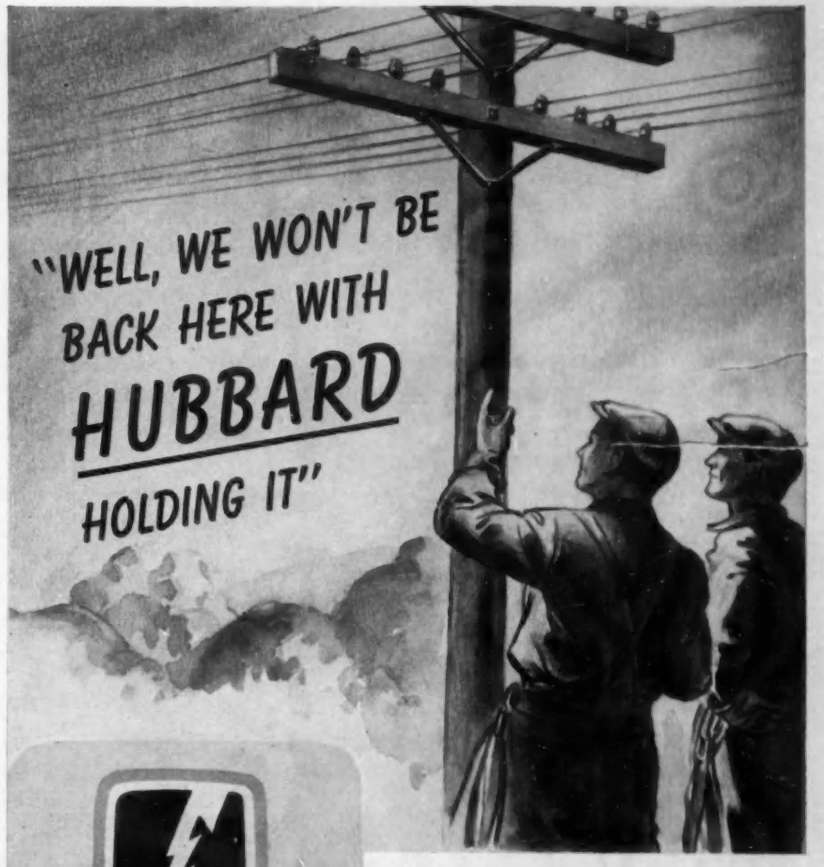
Officers re-elected by the Association included G. W. Robinson, president; F. B. MacKinnon, Harold L. Beyer and W. H. Bryant, vice presidents; Captain W. S. Vivian, secretary-treasurer, and Judge N. G. Hunter, association orator. Captain Vivian was at that time with the Signal Corps in France.

•

Disclosing that the merger of the Los Angeles Home and Pacific systems, scheduled for early in May, 1918, had been postponed for perhaps a half year, C. F. Mason, then commercial superintendent of the Southern California Telephone Company, state that "the merging of the present dual telephone plants and the unification of the service, now in progress, constitutes one of the most difficult feats in telephonic engineering history."

•

Announcement was made by G. B. Rudy, 25 years ago general manager of the York (Pa.) Tel. & Tel. Co., that a full automatic system was to be installed by his company. Increase in the traffic load and shortage of operators were two of the reasons given for the changeover. (G. B. Rudy, Jr., is now general manager of the York company.)



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—and hundreds of other hardware items for pole line construction

Comments like that—which you hear from telephone men everywhere—are common for Hubbard Pole Line Hardware.

Over a long span of years the men who service the vital telephone lines of our country have come to look upon Hubbard Hardware as a friend. They know that once a job's completed with Hubbard they won't be back to make repairs and replacements. They know that Hubbard Pole Line Hardware will last for years . . . for the "duration," or for many durations if you want to put it that way.

And today they know that very quality is helping to save steel for the war effort; is saving manpower and is saving machinery, just as it will help you save.

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Try to Conserve Your Calculagraphs

Calculagraphs, like all things which contain some rationed materials, are subject to certain limitations of manufacture and sale.

In order to insure continued use of your Calculagraphs, it is necessary to make every effort to conserve them.

Here are a few things that will help to keep them in working condition.

1. Clean the printing type frequently.
2. Clean ribbon platen often.
3. Don't put ink onto the ribbon.
4. Keep the lever mechanism and the movement free from dirt and foreign matter.
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Model 33

Our factory repair department stands ready to advise and serve you in any way possible. Write for particulars.

CALCULAGRAPH COMPANY

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CALCULAGRAPH

Accurate Toll Timing to the Second!

COMMUNICATION *IS ON THE MARCH!*

Communication has been mobilized for the March of Freedom—harnessed to the needs of a nation at war. In telephone exchanges across the country; in war industries; in tanks, planes and ships; Phillips telephone products are performing a vital service.

Phillips' half-century of experience in serving Canadian industry in peacetime helps to meet the demands of industrial Canada geared to war—with wire, cable, and telephone apparatus noted for highest quality and dependability.

TELEPHONE WIRE AND CABLE
TELEGRAPH WIRE
MAGNET, AUTOMOTIVE, AIRCRAFT AND BUILDING WIRE
POWER CABLE

Phillips

Electrical Conductors • Communication Equipment

PRIVATE AND PUBLIC TELEPHONE EXCHANGE EQUIPMENT
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TELEPHONE PROTECTIVE APPARATUS
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General Distributors:

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MONTREAL OTTAWA BROCKVILLE HAMILTON WINNIPEG REGINA EDMONTON VANCOUVER

Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY LIMITED, CHICAGO

Signal Corps Training For WAACS Begins

The first group of WAAC Army Signal Corps trainees began schooling recently at the State Teachers' College at Livingston, Alabama, as radio operators, radio, teletypewriter or telephone switchboard repair specialists, the War Department revealed last week. The school is the first of 12 to be used for this type of communications training for 2,000 women.

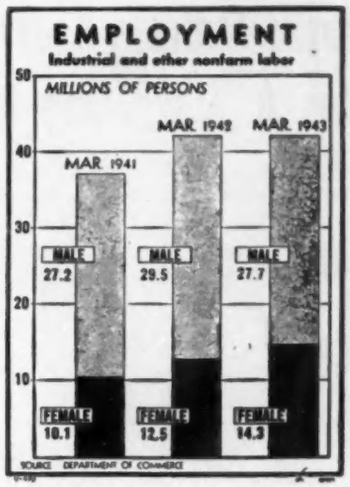
The women, who are being recruited by the Signal Corps to be enrolled in the WAAC on inactive duty as Civil Service employees, are paid at the rate of $1020 per annum for the first three months of training in the mechanic learner course, and $1440 yearly for the second three months of specialized training.

Other schools at which Signal corps training will be given in the near future are: Springfield Trade School, Springfield, Mass.; Boston Teachers' College, Boston, Mass.; Danville Technical School, Danville, Va.; Signal Corps Radio School, Indianapolis, Ind.; Milwaukee Vocational School, Milwaukee, Wis.; Trinidad Junior College, Trinidad, Colo.; Paul Smith College, Saranac, N. Y.; Hadley Technical High School, St. Louis, Mo.; Grant Union Junior College, North Sacramento, Calif.; Air-Craft Defense School, San Antonio, Texas; and West Virginia Institute of Technology, Montgomery, W. Va.

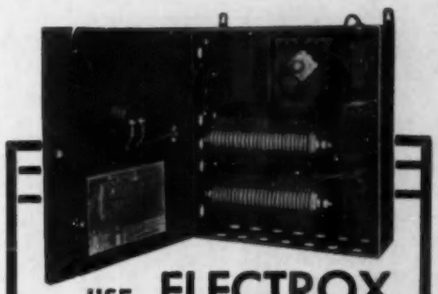
Pennsylvania Commission Authorizes Exchange Sale

The Public Utility Commission of Pennsylvania has authorized the sale of Ono and Lebanon Rural Telephone Company to Bethel and Mt. Aetna Telephone and Telegraph Company and the transfer of certain facilities of the Bethel Company located in North Annville, East Hanover, North Lebanon and North Londonderry Townships, Lebanon County, Penn., to the Bell Telephone Company of Pennsylvania.

Ono was incorporated on February 25, 1909 and serves approximately 163 rural subscribers in East Hanover, Union, North Lebanon, North Annville, Swatara and North Londonderry Townships in Lebanon County. Bethel was incorporated on June 11, 1908, for the purpose of rendering telephone and telegraph service. However, the right to furnish telegraph service was surrendered on November 30, 1923. The company serves approximately 2100 subscribers in seven boroughs and townships in Berks, Dauphin, and Lebanon Counties, including Union, North Lebanon and Swatara Townships in which townships Ono also has charter rights.



On May 2, 1942, Bethel Company entered into an agreement with Ono Company to purchase Bethel for $4250. On November 5, 1942, Bethel Company entered into an agreement with Bell Company that it would sell to Bell facilities in the four townships named for $2165. Completion of the transaction will result in 77 Ono subscribers becoming subscribers of the Bell Company and 86 becoming subscribers of the Bethel Company.



USE ELECTROX RECTIFIERS to Replace Your Batteries

• Supplies DC power for all types of telephone equipment.

BATTERY ELIMINATORS — with or without power-off relays for magneto operators' sets.

BATTERY ELIMINATORS—with constant voltage output for PAX and PBX, with or without sub-cycle ringer.

BATTERY CHARGERS — for trickle charging telephone batteries.

AUTOMATIC BATTERY CHARGERS — for exchange batteries.

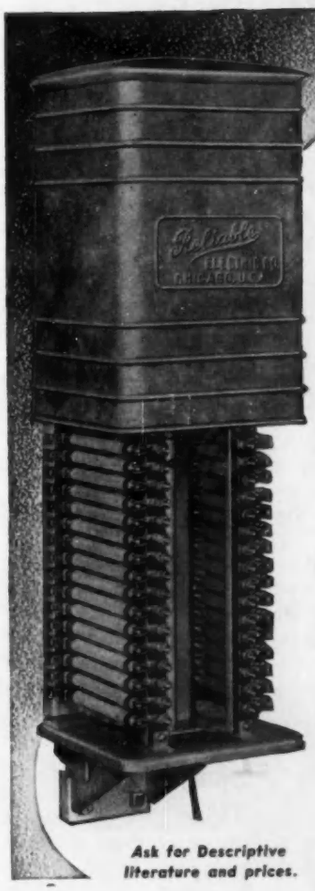
Write for Additional Information

ARMY E NAVY

Army-Navy "E" Flag Awarded Oct. 24, '42

SCHAUER MACHINE CO.

2064 Reading Rd. Cincinnati, Ohio



Ask for Descriptive literature and prices.

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PROTECTION IS RELIABLE INSURANCE

The original design of the Reliable D27 Protected Cable Terminal is a proved standard of protection and maintenance economy. Equipped with the Reliable self-cleaning sawtooth discharge blocks, static discharges are dispelled without lag time, and unnecessary grounding and dirty carbon trouble are eliminated. All connections are made in front within easy reach of the lineman—no need to remove fuses or reach around terminal. The detachable mounting bracket permits one man installation. Exceptionally rugged construction guarantees long, dependable service.

Reliable ELECTRIC COMPANY

OVER 30 YEARS SERVICE TO THE UTILITIES

414 CARROLL AVENUE CHICAGO U.S.A.

A QUESTION!

By an Independent Telephone Pioneer

When and where was the first Automatic telephone exchange installed? (Turn to page 65 for answer.)

THE PIONEER'S CORNER

The following letter was read during the recent Pioneer dinner-dance of the California Chapter held during the convention of the California Independent Telephone Association. It is an open letter to that Chapter and was read by Mrs. Blake.

"Fellow Pioneers—Ladies and Gentlemen:

"I regret I cannot be with you again this year but as Vice President of the California Chapter of the Pioneers I want to welcome you to the first, finest and best Chapter of the Pioneer Association and hope you all are enjoying yourselves to the fullest extent.

"Hitler, Mussolini and Hirohito have made other duties necessary for me at this time and you as telephone manufacturers, jobbers, companies and employees can well be proud of all you have done and are doing in providing the Signal Corps with telephone facilities, men and equipment in this world War No. 2 for peace and democracy.

"As a member of the Signal Corps during the last year I have seen it come to be recognized as one of the major branches of the armed services and it is through each and every telephone employee that it has attained its success 'The message must get through.'

"Let me again wish each and every one a most successful convention and party and that through the help of the Almighty we shall all be together a year from tonight.

(Signed)

Captain Geo. S. Blake"

(Application for membership in the Independent Pioneer Telephone Association may be made to secretary J. K. Johnston, Lemcke Bldg., Indianapolis, Ind. The membership fee is very small and all telephone men are invited to become members.)

North Dakota Convention Has A War Time Keynote

THE 37th annual convention of the North Dakota Telephone Association held in Fargo, June 16, had a wartime keynote in its program. Although this association usually convenes for a two-day session the officers eliminated the extra day and streamlined their program. Despite travel restrictions the attendance was considered quite good with enthusiasm and interest high.

The following directors were re-elected: A. H. Bakken, Mayville, R. R. Borman, Fargo. C. O. Fields, Central Electric and Telephone Company, Devils Lake, was elected in place of J. C. Crookham, Devils Lake, of the same company, who is in the armed services. The hold-over directors are W. R. Williams, Minot, George Rollefson, Starkweather, Theodore P. Clifford, Mohall, G. B. Brown, Enderlin, A. R. Brooks, Hazen, and K. S. Groth, Mayville.

Officers for the year are: president, Mr. Groth, re-elected; Mr. Fields elected vice-president, taking Mr. Crookham's place and A. J. McInnes, re-elected secretary-treasurer.

President Groth in opening the meeting said that the industry has had a trying year but, nevertheless, a generally good grade of service has been rendered regardless of the fact that all companies are undermanned, and material hard to get.

The activities of the association for the past year were reviewed by Secretary-Treasurer McInnes. He said that a great deal of time was consumed in getting various orders prepared and sent to the companies, and in advising in special cases. The financial affairs of the association were in a sound condition, and some new members had been added during the year.

Mr. G. B. Foscue of Chicago, chairman of the U.S.I.T.A. Committee on Coordination stated that the work of his committee as indicated by its title was to work toward building closer cooperation between the National Association and State Associations. "While the cooperation in the past has been fine, he said, it was thought during the war period that this work could be carried on more advantageously by a committee, so that the industry might more effectively direct its operations to render the greatest possible assistance to the country."

R. S. Sturgeon, Fargo, N. W. Bell engineer discussed the "U" orders, 2 and 3, and Board of War Communications order Number 10. Mr. Sturgeon gave a very fine explanation of these orders in terials to the program. language that all could understand, and the numerous questions asked indicated the keen interest of the delegates and there was no question this discussion cleared up some points in the minds of the telephone people. In summing up, Mr. Sturgeon said that "Order U-2 defines maintenance as the minimum upkeep to keep the plant in sound condition, also that repairs cover the restoration of plant. It is specifically stated that neither maintenance or repair shall include improvement of plant."

MR. C. W. McDONNELL, Public Service Commission member, briefly discussed utility regulation and said that the utilities were doing a good job generally of furnishing service under wartime conditions, and particularly complimented the telephone people on their devotion to duty. Mr. McDonnell said the Commission, like business, was feeling the impact of the war, as quite a number of the staff are in the armed services and related industries, however, the Commission is carrying on and handling its business with the least possible delay.

Mr. C. C. Deering secretary of the United States Independent Telephone Association gave a review of the national situation as it affects the telephone industry. He referred to the good results obtained by the coordinating committee and the toll compensation committee.

Traffic problems were discussed by Mr. H. K. Eklund, area traffic supervisor of the Northwestern Bell Telephone Company, Fargo. Mr. Eklund said that all toll traffic had increased very substantially over last year and traffic routed over the Long Lines network increased considerably more than other traffic, with expansion of circuits being curtailed by wartime restrictions on material and a high turnover in the operating force which necessarily slows the speed in handling of calls creates a congestion at times. Nevertheless, he said, through cooperation of all concerned a generally satisfactory service is being rendered.

Mr. R. R. Borman, commercial manager, Northwestern Bell Telephone Company, presented a detailed explanation of the new toll compensation settlement that the Independent companies will receive for handling toll business. Mr. Borman said that this is a three-part settlement and will result in substantial increases to the connecting companies.

Spirited discussions took place throughout the entire meeting and added materially to the program.

LETTERS

from TELEPHONE ENGINEER readers

(Continued from page 14)

country than most people "outside" think it is. For one thing it is big and long so you can have it cold (some of the time) and you can have it hot (some of the time). Then you can have it where it never is as cold as in some of our states. It is not a farming country, yet there are many places where truck gardening can and is being done profitably with big crops maturing in much shorter time than can be done "outside." This is due to ample moisture, good soil and almost around-the-clock sun and daylight.

Telephone service is rather limited and confined to local village or town patrons with very few rural lines tho there are some that serve miners if not too far away. There are no battles over toll compensation, for lack of toll lines, however, this big country is fast changing from what it used to be and after this terrible war has been brought to a close is bound to see a great growth in population thru mass first-hand introduction to people who find they like it and will return. The most contented people I have met in any country or section are the Alaska "Sourdoughs."

Some parts of Alaska are underlaid with perpetually frozen ground or ice which comes up to eighteen inches from the surface. In such areas it is a real problem to rebuild telephone lines as every pole hole has to be "steam bored" (thawed) after poles are set, then old man frost and ice goes to work to exclude them from their domain. They do such a good job that a watchful eye has to be kept on them or else the lead will be found badly leaning or actually on the ground resting, within a year or so. In these areas another big problem is poles for there are no trees. It is not uncommon to see used in their stead 6"x6" or 8"x8" sawed timbers.

Since serving in the Signal Corps for more than a year, from the frying pan to the icebox, Panama—Alaska—this country is the most different. Here, price is no object, everyone pays what is asked and likes it without complaining. A residence telephone may cost $3.50 a month and a party line at that in as small an exchange as one having less than 200 telephones.

I was told that during the time we, "outside," were in the depression dumps business went along as usual up here.

A big surprise was the social side of life. While there is maybe much inclement weather to be put up with, rains, mud, snow at times, and both men and women dress like Eskimos and musshers with native mukluks, various kinds of boots, furs, parkas and pants to suit the weather, comes winter, there are social groups composed of friends who give parties each in turn at their homes. This calls for a change of dress and seemingly out of thin air appear the men and ladies in finery equal to the best found in any society "outside" with dinner far beyond an "outsider's" imagination for goodness and variety.

Before I overlook an important matter, I wish to be sure that my subscription does not reach a cut-off date so please let this be your notice to renew my subscription to both TELEPHONE ENGINEER and Fortnightly for either one, two or three years whichever is the way to do it, sending bill to my home address. Better make it not less than two years as no telling when I may be able to return home and I consider these journals too valuable to lose a single issue.

Cordially yours,

Ray Palmer
c/o Engineering Officer
Alaska Communication System
Federal Building
Anchorage, Alaska

(Dear Ray—Your letter was too good for my eyes alone. Am anxiously awaiting your next report. RWS)

After 33 Years*

Suttle is still your best bet for remanufacturing and

Telephone Repairs

of the highest quality and dependability

DURING WAR TIMES Send them to Suttle

* Suttle has been in business continuously since early in 1910.

DEPEND ON SUTTLE

Let HOLTZER-CABOT *Engineers* help solve your ringing problems

Alternating Current MOTOR-DRIVEN

FOUR FREQUENCY SET

★ ★ ★ ★ ★ ★ ★ ★ ★

★ WE HAVE A COMPLETE LINE OF TELEPHONE RINGING EQUIPMENT ★

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For complete information, Write

THE HOLTZER-CABOT ELECTRIC CO.

125 Amory St., Boston, Massachusetts 6161 So. State St., Chicago, Ill.

ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

Consolidation

Merger of the Southwestern States Telephone Company and the Louisiana Telephone Company was announced by vice president D. T. Strickland of Southwestern after a conference with the Arkansas Utilities Commission June 23.

Although Southwestern's principal operations are in Texas, it has exchanges at Cabot, Jacksonville, Ward, Judsonia and Kennsett, Ark. The Louisiana firm operates 14 small exchanges in North Louisiana. Headquarters are at Brownwood, Texas.

The commission scheduled a hearing for June 28 on Southwestern's application for authority to refund $1,700,000 of six per cent first mortage bonds at 4 ½ per cent interest; to refund $500,000 of six per cent sinking fund debentures at 4 ½ per cent, and to issue 49,976 shares of common of $1 par value each.

Dividend

A semi-annual dividend of 20c per share and an extra dividend of 5c per share, a total of 25c, payable on June 30, 1943 to stockholders of record as of June 15, 1943 has been paid by the Board of Directors of United Utilities, Incorporated.

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Builds *Extra* Precision and Durability into

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● Since 1904 we have built telephone sets so precisely engineered and reliable that they have won the preference of technical experts. With these advantages go fine, clear tone reproduction, smart modern designing and rugged durability.

● Write to Dept. 88 for Catalogue describing Murdock Telephone Sets, Plugs, Push Buttons and Radio Phones.

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Telephone Engineer HANDBOOK TABLES

Subject: Aerial and Underground Cable Splicing Unit Costs (Continued)

Index—Cable Data
Date—July 15, 1943

General:

The following table gives the time required to splice either underground or aerial cable for bridge type splices.

Size of Cable	Splicer Hours Tag	Unit Cost Tag
15 pr. into 25-200	4.	12.50
25 " " 50-200	5.	15.50
50 " " 50-100	9.	27.50
50 " " 200	10.	30.50
50 " " 300	12.	37.00
50 " " 400	14.	43.00
100 " " 200	12.	36.50
100 " " 300-400	14.	43.00
200 " " 300-400	14.	43.00
400 " " 600	24.	73.00

Head of Philippine Company Dies

Colonel Joseph E. H. Stevenot, for many years vice president and general manager of the Philippine Long Distance Telephone Company and one of the leading American industrialists in the Orient, was killed in Australia on June 8. His widow, Mrs. Elma Stevenot, now residing in San Rafael, California, received advice from the War Department stating that the Colonel had met death in an accident, but no details were given. Since Pearl Harbor he had been on active duty with the U. S. Army Signal Corps.

Colonel Stevenot was born in Calaveras County, Calif., in December, 1889, grandson of Gabriel Stevenot, who came from France to the Mother Lode country in 1849. As a young man he went to the Philippines where he developed the Philippine Long Distance Telephone Company, which he headed at the time of the Japanese invasion. His other interests in the Islands included sugar, heavy construction, mining, and electrical equipment.

Immediately after Pearl Harbor, he was commissioned a Lieutenant-Colonel in the Signal Corps, and thereafter continued to direct the operations of the Philippine Long Distance Telephone Company as an officer of the U. S. Army. At the time of the evacuation of Manila, he accompanied our forces to Bataan, then went to Corregidor but was ordered to leave that fortress before its fall. He was advanced to full colonel in June, 1942, at which time he was in charge of lend-lease operations in Australia. During March and April of this year he paid a visit to the United States in the interest of military operations in the Pacific.

A major in the Air Corps during World War I, Colonel Stevenot organized the first aviation corps in the Philippines. He was also the founder and leader of the Boy Scouts in the Islands and was one of the few men to be awarded the Buffalo Medal for distinguished service in the Scout movement.

Colonel Stevenot was a close personal friend of President Quezon, Colonel Romulo and General MacArthur. His intense interest in, and knowledge of, Asiatic problems was evidenced by his constant urging on behalf of greater American defenses on the Islands.

Colonel Stevenot is survived by Mrs. Stevenot and two daughters, Myra Gene and Shirley, students at Dominican College.

Newspaper Lauds Signal Corps

Crediting the United States Army with having the world's best "line of communications," the Wall Street Journal paid tribute to the Signal Corps in a lengthy front-page article May 15. The article afforded a comprehensive picture of the activities of the Signal Corps, pointing out that the Corps uses every known means of communication and is purchasing about five billion dollars of equipment this year, maintaining it in the field and training of tens of thousands of men and women.

Philco Award

For the continued excellence of its war production record, the Simplex Radio Division of Philco Corporation at Sandusky, Ohio, has just been awarded a white star to add to its Army-Navy "E" flag, it was announced June 29 by John Ballantyne, president. This is the fourth star award to Philco Corporation plants. Fully converted to war work, Philco is one of the largest producers of radar and radio communications equipment, and a leading manufacturer of shells, fuzes, and industrial storage batteries for the Army and Navy.

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DURABILITY
No. Vacuum Grip 58
NEWPORT, PA. USA
IF these words were actually stamped into the steel itself they couldn't stand out more clearly. STRENGTH—DURABILITY—especially vital today, when tools must be conserved!
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Argument Set for Hotel Surcharge Rate

With exceptions and briefs by the National Association of Railroad and Utilities Commissioners and the Maryland Commission added to those submitted by the American Telephone and Telegraph Co., and the Chesapeake and Potomac Telephone Co., in the proceeding on hotel surcharges on telephone calls, the FCC June 29 designated oral argument on that issue to be held before it on August 4.

The brief of the two telephone companies, submitted by T. Brooke Price and Edmund S. Hawley for the A. T. & T. and Vice-President and General Counsel Ralph A. Van Orsdel for the C. & P., stressed that the order contemplated in the Proposed Report (1) for the telephone companies to file tariffs showing the surcharges collected by hotels, apartment houses or clubs would be erroneous and unlawful and as a practical matter clearly unreasonable and futile. The brief cited that the telephone companies would have a most difficult time in collecting all the different charges made by the hundreds of hotels, apartments and clubs if the information were obtainable. The telephone companies are not in fact responsible for what the hotels are doing in collecting surcharges, the brief noted, and could not prevent it in any way except by discontinuing service which would threaten the interruption of essential telephone service required by users at the Washington hotels.

The brief took to task the FCC position of classing hotels etc., as connecting carriers and stated that "in plain language they are not in the telephone business and nobody supposes that they are." No evidence had been offered to prove that hotels are common carriers in the telephone field, none holding themselves out to furnish telephone service. Court cases have shown that hotels are not public utilities, the brief added, stressing that the telephone company in the community furnishes all the facilities to the hotel so there is nothing to make a physical connection with another carrier. Hotels, apartments and clubs have never been designated as agents of the telephone companies and the tariff provisions and rates covering them are the same as those applying to other business customers.

•

Meeting in New York recently, presidents of 18 Bell system companies from as many parts of the country noted that all had come up from the ranks and had an average of 38 years of service.

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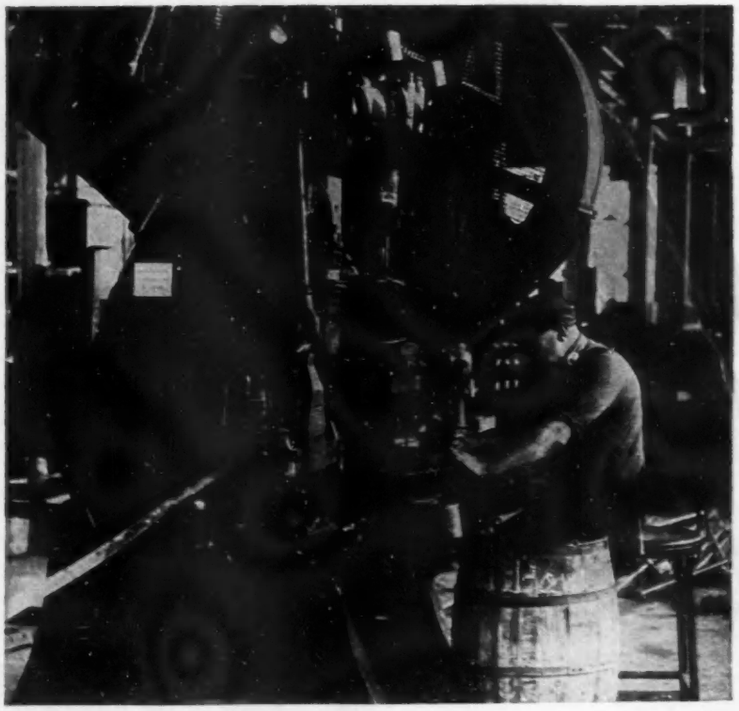

Utilization of old equipment once given up as beyond repair, helps the war effort just as surely as if it were turned in as industrial scrap. Here, a little used press in the Rail Bond Department of the American Steel and Wire Company has been redesigned and produces 25,000 war units per 8-hour shift. Rehabilitation of has-been machinery is the only excuse for not scrapping it.

Army-Navy "E" Presented

Presentation of the Army-Navy "E" Pennant to the Laboratories Division of the Federal Telephone and Radio Corporation, manufacturing affiliate of International Telephone and Telegraph Corporation, was made April 20th on the ground floor of the International Telephone and Telegraph Building, 67 Broad Street, New York City. Left to right, at presentation ceremonies, Maj. Gen. George S. Gibbs, vice chairman of Federal Telephone and Radio Corp., W. E. Boehle, representing the employees of the Laboratories; and Colonel Ira H. Treest, U. S. Army Signal Corps.

Judd Named Vice President

Robert S. Judd last fortnight was elected vice-president in charge of personnel relations of the Southern New England Telephone Co. succeeding Ernest L. Simonds who is retiring from the Bell System under the 65-year age limit program.

Ernest A. Johnson was appointed to succeed Mr. Judd as chief engineer of the company. Mr. Judd entered the telephone industry after his high-school education with a manufacturing company in Connecticut and then joined the Southern New England Co. in 1909. He rose through the ranks in the engineering end of the business to the chief engineership to which he was appointed in 1930.

Suttle Equipment Company Passes Third of Century—Celebrates

Lawrenceville, Ill., newspapers joined with other Southern Illinois publications on June 12 heralding the 33rd year of the Suttle Equipment Company located in Lawrenceville. The Suttle company is busy on a full 6-day week and large quantities of war materials are being manufactured in its plant.

The local newspaper devoted its entire center-spread to the company and the congratulatory messages of neighboring concerns. Featured by a picture of all employees with a 10-year service record the newspaper story outlines the growth of the company, originally a telephone repair business, to its now stature as an integral part of an essential industry. It also informed the public that Suttle was making parts of "radar" which until a short time ago was a closely guarded secret.

The career of Bert D. Quackenbush, vice president and general manager, was traced from the time he came with the company in 1930 and the resulting success of his management. Pictures of Mr. Quackenbush and William C. Strehl,

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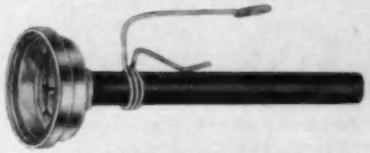
ACTUAL LABORATORY TESTS SHOW THAT THE "PAPER" METHOD OF OBTAINING METAL TEMPERATURE GIVES HIGHLY VARIABLE RESULTS

LAB-REPORT

"In the test, pieces of paper were inserted in molten solder. Simulating actual field conditions, the thickness and characteristics of the papers varied. Some were newspaper, some wrapping paper, still others light cardboard. These all turned brown at different temperatures. Error was further increased by unbiased observers who disagreed on exact shade of brown in test papers.



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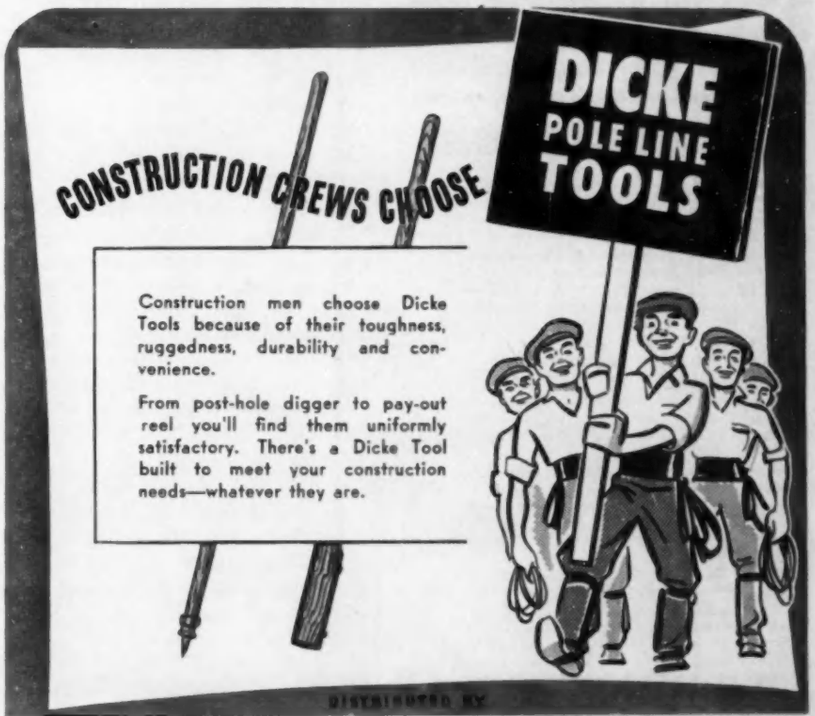
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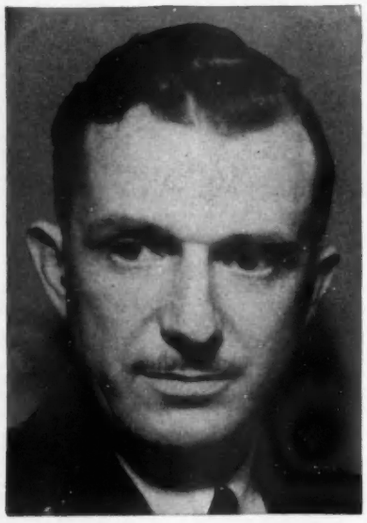
sales manager, were also featured by the newspaper articles.

A. O. Perry New Kellogg Switchboard Sales Manager



Archie O. Perry

For over 19 years, Archie O. Perry, newly appointed manager of Kellogg's Switchboard Sales Department, has been adding to his now thorough knowledge of switchboards and equipment.

Starting as a switchboard installer in 1924, his ability won him steady advancement and 1930 found him in China where he was serving as sales engineer. Mr. Perry spent eight years in the Orient with headquarters in Shanghai. During this period, his entire efforts were devoted to the supervision of installations and telephone systems for the Chinese Government.

In 1938, he returned to the United States and took up the duties of an equipment engineer. This position he held up to the time he assumed his new post with Kellogg.

With such a broad background, Mr. constantly growing number of phone men who look to Kellogg for their switchboard needs.

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New Kellogg Catalog

In the new easy-to-use Rebuilding and Repair Service catalog recently distributed to the telephone industry the Kellogg Switchboard and Supply Company offers 20 fact packed pages of information sure to prove of extreme interest to all operators of telephone exchanges.

Since it is of the utmost importance that telephone companies maintain efficient service and, at the same time, conserve vital materials for the war effort, all idle equipment must be utilized. To aid phone men re-enlist their veteran telephones and equipment for wartime service Kellogg's Rebuilding and Repair Division has been expanded and is now equipped to do that job in excellent fashion and in the fastest and most economical manner.

The rebuilding and repair, service covers virtually all types of equipment including telephones, switchboards, operator's sets, generators, ringers, transmitters, receivers, relays, keys and other components, and is guaranteed to result in operating efficiency that will measure up to new equipment standards of performance. Complete satisfaction is assured and a written guarantee is furnished each user of the service.

Kellogg's conveniently located branch plant at 308 W. Sixth St., Kansas City, Mo., houses the Rebuilding and Repair Division. Here, under the able supervision of Manager R. B. Miles, more and more operating companies are securing like-new apparatus from old, discarded or unserviceable equipment and apparatus, in ever increasing volume. With communications playing so important a role today, this may truly be called another Kellogg service to the telephone industry and the nation as a whole.

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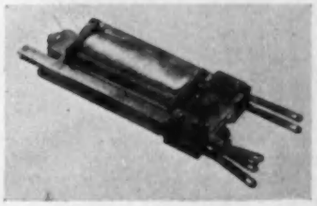

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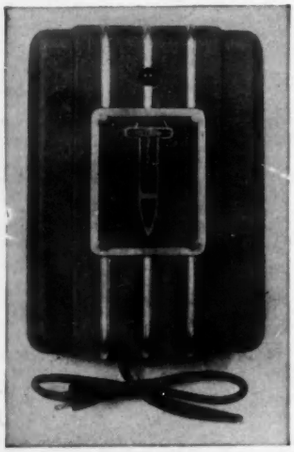

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